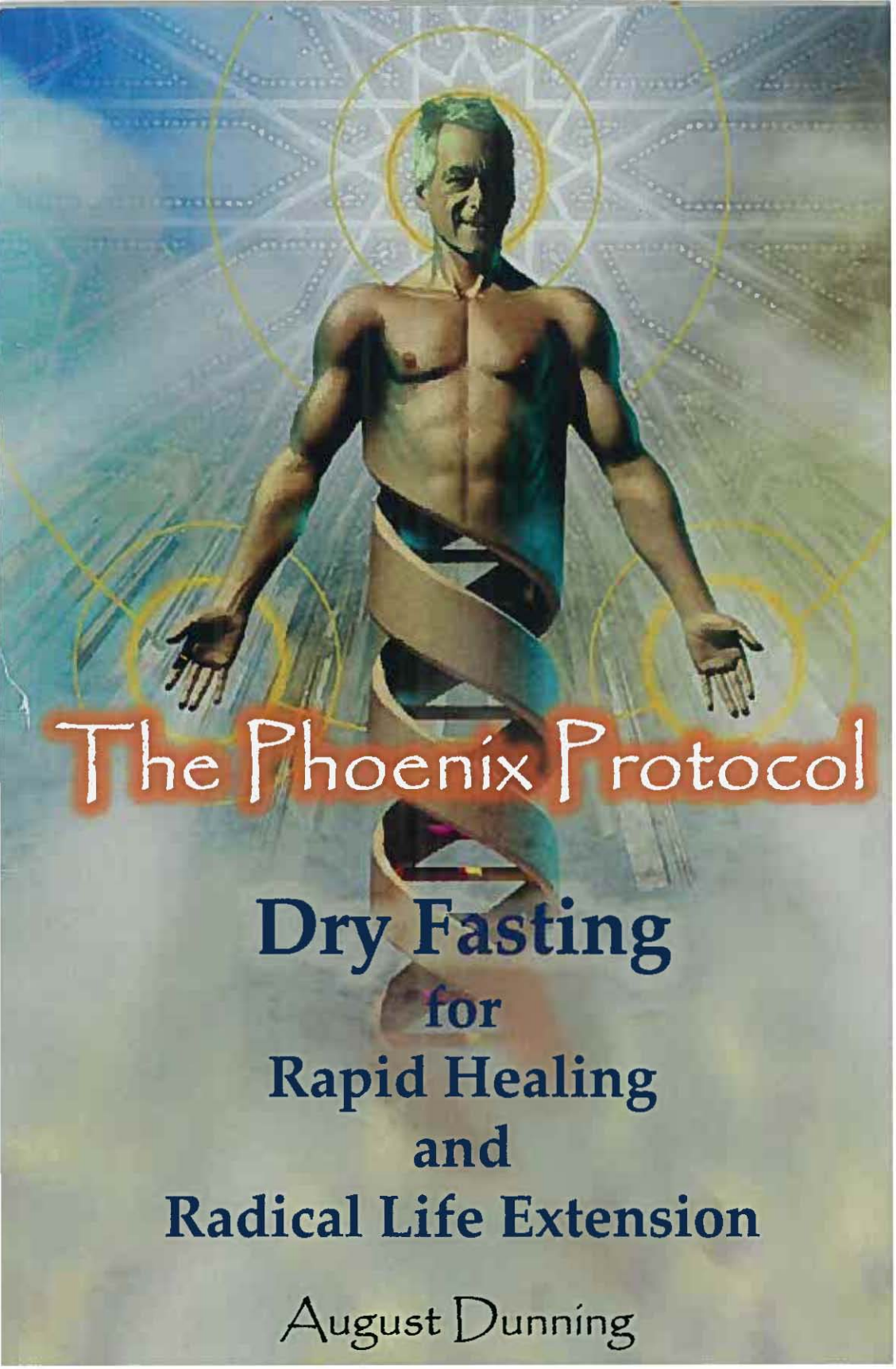

The Phoenix Protocol

Dry Fasting
for
Rapid Healing
and
Radical Life Extension

August Dunning

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This book contains the opinions and ideas of its author. It is intended to provide helpful and informative information on the subject discussed herein. It is sold with the understanding that the author is not engaged in rendering medical, health or any other kind of professional services.

This book contains advice and information related to health care. It should be used to supplement rather than replace the advice of your doctor or another trained health professional. The reader should always consult his or her health care provider to determine the appropriateness of the information for his or her own situation or if he or she has any questions regarding a medical condition or treatment plan. It is recommended that you seek your physician's advice before embarking on any medical program or treatment.

All efforts have been made to assure the accuracy of the information contained in this book. The author disclaims any liability for any medical outcomes that may occur as a result of applying the methods suggested in this book.

This book is dedicated to Sergei and Leonid, without whom this book would not be possible.

Everyone has a doctor in him or her; we just have to help it in its work. The natural healing force within each one of us is the greatest force in getting well.
But to eat when you are sick, is to feed your sickness.
Hippocrates of Kos

Contents

"We cannot discover new oceans
unless we have the courage to lose sight of the shore."
— Andre Gide

An Outrageous Idea

"We are all agreed that your theory is crazy.
The question which divides us is whether
it's crazy enough to have a chance of being correct."
- Niels Bohr

Everyone has a list of perfect foods, everyone has the perfect diet and after millions of pills, potions and promises we still don't live any longer. In fact, America spends more on health care than any other nation on Earth and has more food than any other nation. Isn't it odd that Americans are not the longest living, healthiest people on Earth? Never do we stop to think that maybe medicine and food is not the answer. Hippocrates observed in 400BC that illness continues as long as food is administered. No one ever stops to ask if eating prevents healing.

This book will explain how, by not eating, we can heal illness, lengthen lifespan and maybe...even live forever. Recent scientific discoveries in cellular and anti-aging research have produced the data to support this idea.

All the knowledge exists but extending life to live longer in a body progressively ravaged by age is not an idea worth pursuing. To this end, I ask you to consider an idea that is worth pursuing; to have both a longer life and a younger body by employing a therapeutic healing method called Dry Fasting.

Dry fasting is not new, it was a fully developed rapid healing therapy in Russia years before it was introduced to the West. Dry fasting has been popularized lately as a method for rapid weight loss but weight loss is not the focus of this book. The interest to use dry fasting in this way was likely lifted from the work of the two Russian doctors who perfected it; Dr. Leonid A. Shchennikov and Dr. Sergei I. Filonov. Dry fasting is indeed very effective for weight loss and it's one of its major benefits but not the primary one.

The Phoenix Protocol employs dry fasting for two unique outcomes; rapid healing and its ability to activate adult stem cells. Activating adult stem cells is its unexpected potential; endogenous stem cell therapy.

Recent discoveries in anti-aging research regarding the processes of cellular repair leads me to believe that the Phoenix Protocol is a logical way to dramatically extend lifespan in a younger body; one that's backed by hard science.

I believe, that when properly administered, the Phoenix Protocol can extend lifespan by 25 years or more. I'm certain I've found the way to have both a longer life and a younger body and perhaps even more than that.

The Phoenix Protocol is an idea; to remove senescent cells and repeatedly replace them with endogenous stem cell infusions to ultimately restore youth and radically extend lifespan.

In this way the Phoenix Protocol can reliably activate repeated sustained rejuvenation periods that no other restorative methodology can accomplish.

Out with the old, in with the newer and newer you...

In a way you are in a car speeding towards the edge of a cliff. The Phoenix Protocol allows you to stop, put the car in reverse, back up and move away from the cliff. The cliff is always there but you can decide how far away the car is from the cliff.

This book is not a long one, it's not a text book. I will, however, strive to clearly explain the rather complex science in a way to satisfy the curiosity of any reader at any level of their understanding of human physiology.

And although some of the science is quite complex, I'll try to explain it as simply as I can.

You can certainly use this book to learn how to dry fast correctly to restore health and improve your chances of living longer, but as you will see this outrageous idea is about more than dry fasting for health and longevity...

...it's about functional immortality.

Dry Fasting For Rapid Healing

"Natural forces within us are the true healers of disease."
— Hippocrates

Chapter 1

Beneficial Stress

"That which does not kill us, makes us stronger."
- Friedrich Nietzsche

Dry fasting is hormetic stress. It's a nutritional challenge to initiate an adaptive response that improves biological functionality and thereafter a higher tolerance to more severe challenges.[1]

Dry fasting is a self-imposed abstinence from food and water to cause an adaptive response to make you stronger; 'more ready for what comes next.' Our species is still here after millions of years because we were improved by stress.

Stress is the force that, more than likely, moved us forward along the evolutionary ladder. Stress creates better adaptability in all species. That being said, notwithstanding the changes from genetic mutation by solar and cosmic radiation during geomagnetic field excursions, the present state of biological complexity is probably a result of stress, not luck.[107] It's stress that favors the strong to adapt when environmental conditions change and force the weak to leave the gene pool. Adaptation keeps the ball rolling using new genetic variations to survive the ever-changing environment.

In nature, plants produce phytochemicals as a hormetic response to the stress of insect attack in order to survive in their world of insect predators. Plants can't run away from predators and have had to adapt to their ever changing environment in a different way. Stress induced phytochemicals deter predators.

Simply put, many of these plant attack-response chemicals are bitter and bugs don't like the taste. So seen correctly, plant phytochemicals are not synthesized by plants for humans, phytochemicals are a successful response to stress in order to survive long enough to reproduce. It's just a coincidence that some of these phytochemicals are beneficial to humans, many are not - lectins being the perfect example.

Our ancient human ancestors had to deal with enormous environmental stressors to survive Earths ever-changing environment. They had to endure ice ages, global droughts, had to chase animals in their bare feet, throw a spear to take down game and drag it back to the tribe sometimes miles, even days away. Famine and starvation were more common than feast and plenty. Natural selection allowed the strong to remain to reproduce and carry the species into the future.

Our ancestors also had to preserve muscle during times of starvation to escape and survive in their world of animal predators. Essentially you didn't have to out run the sabretooth tiger, you just had to outrun the others in the tribe also being chased by the sabretooth tiger. Nature

reduced the gene pool to those most able to adapt to stress. You are the descendant of ancestors that responded to starvation stress with the ability to preserve vital body proteins. Humans wouldn't have survived if an alternative energy source other than glucose couldn't be called upon to preserve muscle during starvation stress. Our brain would have been extremely vulnerable during starvation if it only relied on glucose. Our muscle tissue would have been broken down rapidly and converted into glucose to feed our sugar-hungry brains until we didn't have enough muscle strength left to find food.

Fortunately humans developed an ability, as a result of surviving starvation stress, one that's turned on during starvation; it's called autophagy. Autophagy is a life-critical survival trait. It activates the systems that protect brain and muscle. It also cleans the cells, restores metabolic function and provides rebuilding materials for new cells. Activating autophagy deliberately makes it easier to survive future challenges. It's a beneficial stress.

This type of stress will be applied in a way to achieve the goals of the Phoenix Protocol - to use the beneficial stress of starvation to cause a transformation of your aging body into a more youthful and earlier version. Starvation stress induces this repair response that's been incorporated into our genetics.

"It's not stress that kills us, it's our reaction to it."
– Hans Selye

Chapter 2

Dry Fasting

"To do nothing is a good remedy."
- Hippocrates

Dry fasting is a deliberate pause of digestive function for a number of days. The Phoenix Protocol is only 7 days. Compared to other types of fasting, dry fasting is a remarkably more comfortable form as you will soon learn.

There are two types of dry fasting:

A soft dry fast allows you to come into contact with water such as bathing, washing your hands and face but not swallowing any water.

A hard dry fast requires no contact with any water whatsoever (this type of fasting is not recommended).

Dry fasting is a far rarer form of fasting because people have been convinced that it's impossible to go without water for longer than three days. But this assumption is incorrect because the body has the ability to make its own water, endogenous water, during the transformation of fatty acids stored in adipose tissue into ATP.

The Russian doctors, who perfected dry fasting, determined that the only stipulation is that no water enters the gastrointestinal tract via the mouth. They found that drinking water stimulates gastric juices and stops the

transition to endogenous nutrition. Drinking water during a fast also prevents the blood from becoming concentrated which then can't stimulate the hypothalamus to start endogenous water production as described in the next chapter. Bathing is recommended and takes advantage of the skin's ability to absorb water in a type of counter flow into the skin. This method improves the ability of the body to flush toxins out of the extracellular matrix into the lymphatic system without gastrointestinal tract involvement.[29,30]

There are two cardinal rules that cannot be violated during a fast. These are critical physiological conditions that must be maintained.

1: Blood glucose levels must be maintained because the brain and red blood cells absolutely depend on glucose for fuel in order to stay alive.[23,27]

2: Vital proteins in the heart and skeletal muscles must be protected to prevent loss of function.[8,10]

Dry fasting obeys the cardinal rules

As I mentioned in the section on stress, muscle mass is designed to be protected by using an alternative energy source for glucose to avoid breaking down muscle protein but also to protect the brain. Brain, heart and muscle mass is protected during dry fasting by drawing on the energy stored in fat cells to maintain blood glucose. Fat cells contain triglycerides that are a combination of fatty acids and glycerol and although fatty acids can't be converted into glucose, glycerol can.[2]

When liver glycogen runs out early in a fast, blood sugar levels drop as well as insulin levels.[3] Insulin is used to move glucose into cells for energy so another way to produce energy in cells has to be found.[2]

When insulin levels run low, it creates a stress response in β cells of the pancreas that signals α cells to secrete glucagon. This stress response sends out glucagon to temporarily find glycogen in muscles for the liver to convert into glucose. Glucagon also stimulates the pituitary gland to secrete growth hormone to slow muscle tissue loss at the same time.[4]

When glycogen in muscle is exhausted, energy requirements are met by cleaving triglycerides, stored in fat cells, for their glycerol and fatty acids. Although glycerol and fatty acids can be directly turned into fuel, in many cells throughout the body, they are not used as energy by brain cells at all.

To meet the energy needs of your brain, the freed glycerol and free fatty acids are converted in the liver into glucose and ketones in a process called ketogenesis.

Ketogenesis produces acetoacetate which is then converted into two other types of ketone bodies: beta-hydroxybutyrate (BHB) for energy and acetone which is mostly excreted as waste. When ketones build up in the blood they make the blood more acidic creating a condition called ketosis.[7,55]

Gluconeogenesis

Gluconeogenesis means 'making new sugar'. Being able to convert amino acids, fatty acids, glycerol and lactate into

sugar and ketones are all the safeguards needed to meet the glucose needs of the body and brain during fasting. When the body has exhausted all other sources to make glucose, except proteins, muscle tissue is broken down into gluconeogenic and ketogenic amino acids to be converted into glucose and ketones.

Fortunately, the Phoenix Protocol doesn't break down muscle protein since it doesn't utilize amino acids to produce glucose.[4,5,7,12,15] After all glycogen is exhausted the body turns to stored fat in fat cells for metabolism.[2]

Fatty acids are turned into water

Water makes up 10% of the contents in fat cells while triglycerides make up 90%. Fat cells provide fatty acids that are transformed into your own water; endogenous water. Fatty acids are long chains of carbon bonded to hydrogen atoms fixed to an acetyl group.

Fatty acids are processed in the mitochondria citric acid cycle inside the 37.2 trillion cells of the body to make ATP. During the production of ATP the carbon+hydrogen chains in fatty acids are broken apart.

100 grams of fatty acids are converted into 280 grams of CO_2 and 115 grams of H_2O (water) from combining oxygen atoms in the air you breathe with the carbon and hydrogen atoms broken from the chains in fatty acids.

Water is just one of the byproducts of creating ATP in the mitochondria so all 37.2 trillion cells are making plenty of water. Endogenous water.

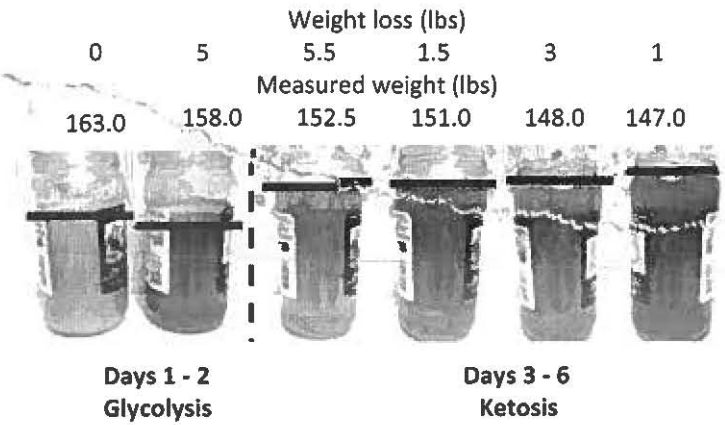
That's why you're not thirsty on a dry fast.

Physical evidence of endogenous water production

Evidence of this is seen in the urine output during a 7 day dry fast while not drinking any water.

After glucose is exhausted, urine output increases as the fast continues. The results in the image below show that during the first two days of a dry fast, urine output is lower because glycogen in the liver is being used to produce glucose for metabolism. Notice that the urine output is greater during days 3 to 6 when the body is in ketosis. Also notice the total amount of weight loss - 16lbs.

7 Day Dry Fast Urine Output



The results seen above make it obvious that this amount of urine output cannot possibly occur without a source of water from inside the body.

Since endogenic water is created from metabolizing fatty acids, there is no requirement for water to be ingested nor is there any craving for water during a dry

fast. I can attest to this; I was not thirsty at all during any of my dry fasts.

The way the body accomplishes this remarkable feat is by stress responses occurring at the cellular level.

Dehydration stress creates endogenous water

Not drinking water while fasting flips a chemical switch to convert fatty acids in fat into water.[2] But the critical moment is at the end of day 2, when blood sugar levels fall dramatically as glycolysis ends after glycogen in liver and muscle is exhausted…you're running out of fuel.

It's analogous to when you're flying in an airplane and the engine stops. You're suddenly in free fall and you have to find more fuel to restart the engine to stay aloft. Your body has two pathways to find fuel...the following is the pathway dry fasting keeps you flying…

After day 2 of a dry fast, dissolved solids in the blood increase due to dehydration. This stimulates the osmoreceptors in the hypothalamus to activate the posterior part of the pituitary gland to release antidiuretic hormone (ADH). ADH stimulates the adrenal medulla on the kidneys to release epinephrine. Epinephrine induces lipolysis by activating the enzyme lipase to cleave fatty acids and glycerol from triglycerides stored in fat cells.[5]

Once freed, glycerol and fatty acids are released into the blood stream and travel to hepatocytes in the liver which then starts making fuel again - glucose and ketones.[18] The free fatty acids in the blood stream are also delivered to mitochondrion in cells all over the body.

β oxidation in the inner mitochondria matrix cuts CO.CoA from the chains of fatty acids to make small units of carbon and hydrogen and acetyl CoA: (CH_3.CO.CoA). The chains are broke down in this way to enter the citric acid cycle which produces water in the ATP electron transport chain in all 37.2 trillion cells of the body.[6]

The engine restarts and you stay aloft. This pathway makes fuel again, saves muscle mass and makes endogenic water.

However, drinking water during fasting prevents endogenic water synthesis because fat cells are not stimulated to release glycerol and fatty acids for glucose and water; the blood never concentrates. Furthermore, this forces the body to use gluconeogenesis to make glucose from muscle protein. This violates the second cardinal rule; to protect muscle mass.

Drinking water feeds bacteria, viruses and parasites

Every form of life requires water including bacteria, viruses and parasites. By eliminating external water, during a dry fast, the body is forced to create its own endogenous water. But this ability in human metabolism, that has evolved from stress and natural selection over millions of years, is not available to the pathogenic organisms. Pathogenic organisms can't make their own water and as a result they are eliminated by day 5 of a dry fast. Drinking water during fasting keeps these organisms alive. One caveat is the family of RNA virus as explained in chapter 5.

This is why the Russian doctors considered dry fasting to be the most effective form of fasting because the body makes its own water; which they call 'Water of Life.'

A secondary source of endogenous water

Dry fasting also turns on another process; autophagy. In particular chaperone mediated autophagy (CMA). This process breaks down protein sources but not muscle protein. Damaged cellular structures are delivered into cells where CMA targets these weak and damaged cells and digests their cytoskeleton proteins into amino acids inside lysosomes. This source of amino acids from proteins, in cell structures, are also found in scar tissue, tumors, cysts, folded proteins, AGE's as well as malfunctioning and senescent cells. These sources of proteins, created by autophagy, are not utilized for energy but rather their amino acids are re-purposed for metabolic needs like new protein synthesis in order to repair cells.

Additionally, water makes up 60% of the volume in weak cells and when degraded they provide another source of water that is also added to the overall water in the system.

Weight changes during and after fasting

During a dry fast, significant weight is lost and regained much to the consternation of those employing dry fasting for weight loss. Dry fasting was originally developed as a medical therapeutic application for rapid healing not necessarily weight loss. Weight can be kept off after a dry fast by restricting foods that contain carbohydrates (sugars). Carbohydrates spike insulin - insulin builds fat.

The body is a complex protein factory that operates optimally when fully hydrated. Water is essential for metabolic homeostasis. When a fast begins, the body is burning glycogen in the liver and muscle for energy. Water is the byproduct of that energy production in the mitochondria. By the second day of a dry fast, most of this water production has been eliminated via the urine and this loss represents water weight of about 3lbs per day. This does not represent fat loss...yet. On the third day of a dry fast, the body runs out of glycogen and starts converting fat in fat cells for energy and water. From that point on the weight that's lost is fat.

During the first 2 days of a dry fast only water weight is lost. From day 3 to day 7 fat is lost. After the fast this water weight loss is rapidly regained. This weight gain is the body's method of restoring hydration to tissue to maintain proper protein synthesis.

Expectations regarding weight loss and weight gain must be measured with these aspects of body homeostasis.

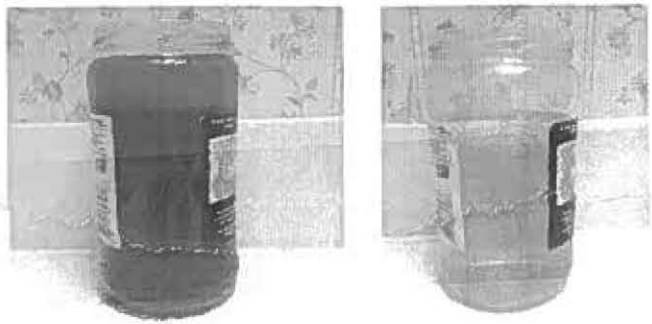
Detoxification during dry fasting

The detoxification process, during a dry fast, goes mostly unnoticed because the body is eliminating toxins the way it was designed.

The body sequesters toxins in fat cells. During a dry fast, toxins released from fat cells are processed in the liver and exit the bowel as a dark orange sludge. The body also stores toxins in the body's cells. The counter flow

absorption of water though the skin, from daily showers, helps flush toxins, from body cells, into the lymphatic system and this flow enters the blood stream where it's excreted in urine. Urine becomes dark and cloudy as toxins and cellular debris are eliminated.

But at the end of a fast, the urine is clear and normal in a very short amount of time.



Last Day of a 7 day Dry Fast **Three Days Later**

You don't experience the withdrawal symptoms from caffeine or the detox reactions with dry fasting that are typical with water fasting. Water fasting often begins with suffering through intense headaches with the advice to 'push through the pain' to get past the uncomfortable start.

I can confirm this as well, I've tried water fasting and I won't do it again. After reading the analysis of water fasting in the next chapter, I'm pretty sure you won't either.

Dry fasting is the safest form of fasting

As described earlier, when glucose runs out after the second day of a dry fast, dehydration stress stimulates epinephrine to mobilize large quantities of glycerol from adipose tissue. This provides glycerol for conversion into glucose for metabolism instead of breaking down skeletal muscle and acts as a protein 'sparer' to protect vital organ protein.

The Phoenix Protocol obeys both cardinal rules by maintaining blood glucose levels and protecting heart and skeletal muscle by employing fat cells instead of muscle proteins to synthesize glucose and ketones.

Conclusion

The important difference between drinking and not drinking water during a fast is:

-Dry fasting regenerates your body in a healing mode with enormous health and longevity benefits. It keeps you aloft and allows you to land safely after the fast.

-Water fasting forces the breakdown of vital body mass, putting your life at risk and any health benefits take far longer to achieve. It keeps you aloft for a while but you risk a crash landing.

*"You cannot always control what goes on outside,
but you can always control what goes on inside."*
– Wayne Dyer

Chapter 3

Water Fasting

"One of life's greatest challenges is knowing enough about a subject to think you're right but not knowing enough about it to know you're wrong."
-Neil deGrasse Tyson

A water fast is not a fast, *it's a water diet.* The best evidence of this comes from the Russian doctor who perfected and patented a method of dry fasting. He discovered from clinical testing that when any external water is taken into the body it's treated as food:

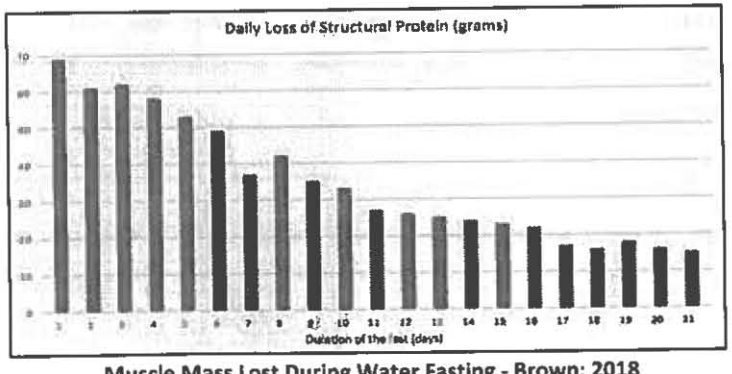
> *"If there is any hunger at all during a dry fast, an enema will stop it."*
>
> *-Dr. Shchennikov*

Water is a highly deficient form of nutrient intake and has multiple deleterious effects when consumed while fasting.

Using the airplane analogy in chapter 2, your engine stops, you are in free fall, but drinking water during a fast diverts the pathway for fuel down the other pathway. The body goes into emergency survival mode when it goes down this pathway and it's not pretty...

Energy production during fasting is very different when you're drinking water.[9] The total dissolved solids in the blood is low and the osmoreceptors in the hypothalamus are not stimulated to signal the posterior pituitary gland to release ADH. You have plenty of water. Without ADH the adrenal medulla isn't stimulated to release epinephrine to

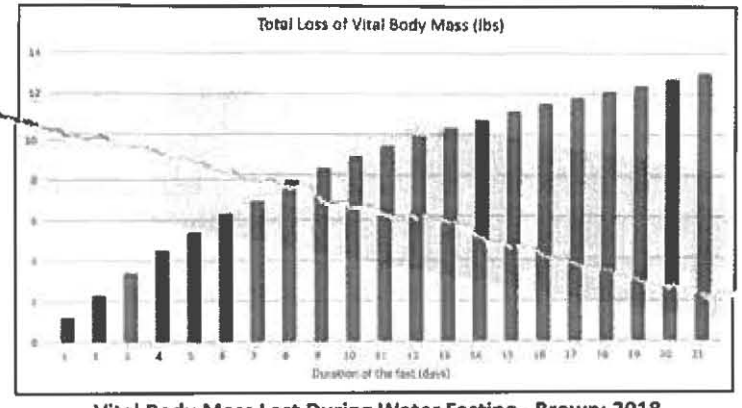
stimulate lipolysis.[5,6,11] Without epinephrine, lipase isn't activated to unlock glycerol and fatty acids stored in fat. This severely reduces the utilization of stored fat for fuel. When there's no signal to stimulate epinephrine to dig into fat stores (since you're fully hydrated) glucose is then temporarily produced from glycogen stored in skeletal muscle.[7,16,21,23] Thereafter, with glycogen exhausted and glycerol mostly unavailable from fat cells, hepatocytes in the liver start synthesizing glucose through gluconeogenesis using pyruvate, lactate and glucogenic amino acids (primarily alanine) taken from skeletal muscle tissue.[14,16,18] The ketogenic amino acid leucine is used to make ketones in the absence of fatty acids from fat cells.[7,12,15,17,19] Urinary nitrogen excretion has been reported to be either unchanged or increasing indicating protein decomposition because nitrogen is found in amino acids.[11,12,13] Amino acids make protein. This is evidenced by the loss of skeletal muscle protein, at the beginning of a fast, when drinking water.[8] The loss rate is reduced over time but it's only a means of surviving starvation.



Muscle Mass Lost During Water Fasting - Brown: 2018

Forearm net protein breakdown increases after 30 and 60 hours.[15,17] When fat is not available for fuel, the effects of growth hormone on protein metabolism become more pronounced. Then, instead of protecting muscle mass loss, growth hormone is used for finding fuel. This results in the loss of vital body mass protein as urea production rates increase by approximately 50%.[10]

But loss of muscle mass is not nearly as important as the loss of vital body mass.



Vital Body Mass Lost During Water Fasting - Brown: 2018

This chart shows cumulative vital body mass lost over the same period of time as the previous chart. What this chart actually reveals is the indiscriminate digestion of not only muscle but other protein taken from body organs.[16] The basic building blocks of vital body mass come from vital organ tissue. The most important and vital organ in the body is the heart and it's being damaged.[17] The skeletal muscle mass loss **decrease** is negated by the total vital body mass loss **increase**. There is no way to avoid this life

threatening loss of tissue caused by drinking water during a fast.

Water and the role of sirtuins in gluconeogenesis

There are 7 different sirtuins; they're found in different locations in all cells; SIRT1, SIRT6 and SIRT7 are in the nucleus, SIRT3, SIRT4 and SIRT5 are in mitochondria, SIRT2 is in the cytoplasm.[21] And although sirtuins direct the biochemical pathway to utilize stores of fat for energy during dry fasting, they act very differently when the body is starved of food while being hydrated.

SIRT1 has emerged as a regulator of glucose metabolism. During gluconeogenesis SIRT1 has a dual and intricate role.

In the short-term phase of a water fast, during the transition out of glycogenolysis, SIRT1 induces decreased hepatic glucose production by suppressing CRTC2; a key mediator of early phase gluconeogenesis.[22] Also during the early phase of water fasting, SIRT1 destabilizes a hepatic transcription factor for lipogenesis and represses fatty acid synthesis, further confounding ketogenesis.

During prolonged water fasting, SIRT1 reinforces the gluconeogenic transcriptional program to start breaking down vital body mass to sustain plasma glucose production.[23]

SIRT2 is predominantly a cytoplasmic protein and pretty abundant in adipocytes. SIRT2 reduces the amount of lipids, taken from fat cells in a water fast, and enhances gluconeogenesis during times of glucose deprivation.[24] SIRT2 facilitates lipolysis during nutrient deprivation *and* dehydration but not when the body is fully hydrated. The

link between SIRT2 and fatty acid oxidation has been elusive because hydration status has not yet been considered in research.

SIRT3, **SIRT4**, and **SIRT5** are primarily located in mitochondria and sense and regulate the energy status in this organelle. Such as activating decoupling proteins to either make energy or heat in white and brown fat. SIRT3 inhibits glycolysis and glucose oxidation when adipocytes are not able to be used for fuel. SIRT3 then facilitates gluconeogenesis by triggering β-oxidation in mitochondria, in hepatocytes in the liver and in skeletal muscles, to process pyruvate into oxaloacetate promoting ketogenesis from amino acids.[25,26] SIRT4 exhibits a negative regulatory role towards fatty acid oxidation. SIRT5 activates a ketogenic enzyme to stimulate ketogenesis that further reduces fatty acid oxidation.

SIRT6 indirectly down regulates hepatic glucose production, plays a critical role in glucose homeostasis and regulates fat metabolism by controlling lipid storage under starvation stress based on upstream chemical signals from hydration level reactions.[27,28]

SIRT7 is involved with lipogenesis for fat accumulation and storage. During gluconeogenesis it's a gate keeper for lipolysis in case dehydration occurs.

Therefore, sirtuins redirect the production of plasma glucose via gluconeogenesis as a reaction to hydration.

Gluconeogenesis digests muscle for its alanine and 16 other amino acids from vital body mass as the water fast continues.[16-19] And this violates the second cardinal rule of fasting to protect protein mass.

The longer a person stays on a water fast, the more vital body mass is lost and the higher the risk of mortality. The loss of tissue from vital organs, in some cases, is irreversible and you risk heart failure.[14] In fact, at least three people have died from sudden heart failure while using water fasting to treat obesity.[17,20] Water fasting can come with a steep price.

Gluconeogenesis restarts the engine on the airplane but you're drilling holes in the airplane to stay aloft...you can't stay aloft very long.

Chapter 4

Autophagy - Cellular Housekeeping

"Detoxify or die."

-Sherry Rogers

Dry fasting is the first step to radical life extension because it maintains an extended period of autophagy to clean out years of stored inner-cellular trash and age markers to restore youthful cellular function.

There's an ancient Babylonian proverb from 2200BC that perhaps you've heard before:

"Cleanliness is next to godliness."

Gods are immortal. Pay close attention...

The word autophagy is from the ancient Greek and reveals its meaning; 'auto' means self and 'phagy' means to eat. The literal meaning of autophagy is 'self-eating.' It's the body's self-correcting system that operates when digestion is interrupted.[55]

Do you eat or drink when you're asleep?

Sleep is dry fasting. Sleep is a period with no food and no water that stimulates a nightly period of autophagy.

Autophagy is the primary degradative pathway for recycling cell parts, digesting bacteria, viruses and damaged proteins as well as delivering nutrients into cells and waste out of the cells.

Healing is designed into our genetics to turn on during periods of not eating. Hippocrates recognized this phenomenon over 2000 years ago.

Sleep is a rest period for the digestive system and resets the daily hormone system. Sleep allows the hippocampus to perform memory sorting to send short term memories into long term memory storage.[37]

More importantly, sleep tells the night crew to wake up and clean the place; a cleaning crew that's gone in the morning when you 'break'fast.

Eating turns off autophagy.[56]

Endocytosis, autophagy, exocytosis

Cells are designed to do three things; bring things in from the extracellular matrix - endocytosis; process the things that are brought in - autophagy; get things out of the cell - exocytosis.

Autophagy is a type of housekeeping operation inside the cell. It's designed to deal with things brought in and to maintain the function of the internal parts of the cell to sustain optimal operation of the internal organelles. This is an essential function; one that enables the cell to process materials, correct or replace internal organelles and to later rid the cell of waste.

Autophagy is strongly activated after 2 to 3 days of fasting and can have profound effects on healing and longevity. Extending the time in autophagy, by dry fasting, allows for more complex cellular repair. The housekeeping function cannot be maintained without being able to

dissolve and recycle old parts in a specialized organelle - the lysosome.

Autophagy is totally reliant on lysosomes

The way to conceptualize lysosomes is to imagine that cells are like your house and that your house has little ovens (lysosomes) to burn trash. If the ovens can't burn trash, the trash starts accumulating and rotting inside your house. Similarly, if lysosomes can't get rid of the trash, in the cell, the cell start filling up with toxic protein trash.

There are multiple autophagic repair activities and all rely on lysosomes. One of autophagy's primary jobs is to eliminate damaged lysosomes and replace them to maintain their degradative function. Referring to the analogy above, it's the same as throwing out old broken ovens and bringing in new ones. Autophagy is responsible for the degradation of most long-lived and aggregated proteins and for the way the cellular organelles such as non-functioning mitochondria, peroxisomes, ribosomes and infectious organisms are degraded, restored or replaced.[59] They make sure cells can process nutrients, dispose of pathogens and cellular trash then turn the ashes of their deconstruction into rebuilding materials to construct new cell parts and body cells.[2,57,56]

Tadpoles are the perfect example of how this works...

A frog begins life as a tadpole; basically a head and mouth with a huge tail. When the time comes, arm and leg buds start to appear on the body of the tadpole and it stops

eating. Slowly the tail disappears and a metamorphic change gets underway. As the tail disappears, arms and legs grow in size and the tadpole transforms into a frog.

Where did the tail go?

It was digested in the autophagic process of protein deconstruction and re-purposed; converted into building materials to create bone, nerves, blood vessels and muscle to create the frog - like a Phoenix; born anew from the ashes of the old - the digested parts of its tail in this case.

Lysosomes are the cells stomach

Lysosomes function as the digestive system of the cell, serving both to degrade material taken in from outside the cell and to digest obsolete components inside the cell itself.[58]

When you eat food, proteins in food are broken down in the stomach into amino acids and released into the body to be reassembled in cells into new proteins. After proteins have been used for their intended purpose, some are returned into cells and digested inside lysosomes back into amino acids again and released into the cell cytoplasm to make new proteins. This recycling of proteins is only made possible by autophagy. The body cannot live without an abundant source of available amino acids in the cells to make new proteins.

How lysosomes function

Lysosomes are ball shaped containers that hold an array of enzymes capable of breaking down all types of biological polymers, proteins, nucleic acids, carbohydrates

and lipids. Lysosomes are effective because they contain about 50 different hydrolytic enzymes that can dissolve just about everything you throw at them. All of the enzymes are acid hydrolases at 5.0 pH inside the lysosome. They're like a vat of acid. The acid environment is maintained by proton pumps that transport hydrogen ions into the lysosome to keep them acidic.

They come in a considerable variation in size and shape to accommodate the different sizes of the materials that have been taken up for digestion like little viruses, larger bacteria and big useless damaged proteins.

Lysosomes are very efficient at ending all types of bacterial and even viral infections (if the cell has adequate deacetylation capability in place - see next chapter) in the first 4 to 5 days of a dry fast. It's a pretty simple process.

When a bacteria is captured, by receptors on the cell membrane, the process of endocytosis brings the bacteria inside the cell where it is encapsulated into an autophagosome vesicle (a capsule with the bacteria inside it). The vesicle holding the bacteria is combined with a lysosome to dissolve it.

There are three basic types of autophagic methods inside the cell that process materials that are brought into cells as well as processing old organelles for replacement.

Macroautophagy

Macroautophagy sequesters large cargo inside a double-membrane vesicle, an autophagosome, inside the cell.

Macroautophagy creates a vesicle inside the cell, an autophagosome, that encapsulates materials like worn out organelles. This encapsulation vesicle is transported with motor proteins to the lysosomes via microtubules and attached to the lysosome membrane where it merges with a lysosome for degradation. Macroautophagy is also the way new empty lysosome vesicles are constructed inside the cell and filled up with acid hydrolase enzymes delivered from the Endoplasmic Reticulum.[60]

Microautophagy

Microautophagy directly captures smaller cargo inside the cell on the lysosome membrane.

Materials outside the cell are captured on the surface of the cell using chemical receptors, in depressions and cavities on the cell membrane, in the process of endocytosis. Once inside the cell, an autophagosome is formed to encapsulate it into a vesicle which is again transported via motor proteins along the microtubule system to a lysosome to be processed.[3]

Chaperone Mediated Autophagy (CMA)

CMA uses a chaperone (a type of protein already inside the cell) to shepherd materials directly across the lysosome membrane for degradation.

The unique feature of CMA is how it selects damaged proteins for degradation and how they are transferred into lysosomes. Folded proteins are first broken down by the ubiquitin-proteasome system into a size allowing for direct transfer into lysosomes. There is no requirement to

encapsulate proteins into a vesicle first before they can be degraded.[60]

The Ubiquitin-Proteasome System (UPS)

A molecular machine, similar to a wood chipper, that takes large protein aggregates and breaks them into smaller pieces.

Starvation actually activates two major pathways to degrade most cellular proteins inside cells; CMA and the UPS. Both are critical for the maintenance of internal cell functionality.[54] These two catabolic pathways, working in harmony in the cytoplasm, constitute essential components of cellular protein quality control which senses misfolded or damaged proteins and tags them for degradation. The ubiquitin-proteasome system is responsible for degrading 80-90% of proteins inside cells. These include many regulated, short-lived, abnormal, denatured or damaged proteins that are broken down into smaller sizes to enable chaperone mediated autophagy to shepherd the smaller bits into lysosomes.[54,62]

Lysosomes in aging cells

Older cells of all types have dysfunctional CMA processes that result in the build-up of proteins because they can't be digested by their age-damaged lysosomes.[52] This is very likely a major contributing factor leading to cellular senescence - too much trash accumulating inside the cell. Older cells have aging lysosomes that can't digest damaged proteins, via hydrolysis, due to the inability of their Lamp-2A receptor sites to accept proteins for

degradation.[66] Without extended autophagy to initiate renewal and replacement of old lysosomes, cells fail because the receptor sites on their old lysosomes just simply wear out.

Removal of dead and senescent cells

If you can't fix broken cells, get rid of them. Dry fasting can activate a period of aggressive autophagy that eliminates senescent cells.

On the third day of a dry fast, bone marrow stem cells are stimulated to produce monocytes to create macrophages. Macrophages are specialized cells that perform a type of autophagic function, outside cells, by first engulfing senescent cells much like an autophagosome inside a cell. Once inside the macrophage, the UPS and CMA break down the senescent cell into small bits that are directly transferred into lysosomes. Once inside the lysosome they're rapidly degraded in only 5 to 10 minutes.[53,62,67]

Aggressive autophagy

Every night there is some level of autophagy acting on the body to try to repair some portion of the damage from the previous day. Naturally without longer periods of autophagy, you can't perform major cellular system correction to keep the organelles inside the cell working.

Cellular organelles (like lysosomes, ribosomes and mitochondria) lose their ability to function efficiently over time. An autophagosome encapsulates old, worn out parts and transports them with motor proteins along the

microtubule system to the lysosomes to be recycled into amino acids for reuse. It takes at least 3 days of dry fasting to activate the level of autophagy to replace these worn out cell organelles. Yet, if you never stop eating, that level of repair can't be accomplished and directly contributes to aging. This level of cellular system repair takes time, it can't be done during the nightly period of autophagy.

How much time does it take?

Macroautophagy and microautophagy are activated as early as 30 minutes into starvation and remain highly active for at least 4 to 8 hours. It's the night crew turned on during sleep. If the starvation state persists for more than 10 hours, the cells switch to chaperone mediated autophagy; it's the demolition and rebuilding crew. CMA is maximally up-regulated under stress conditions such as prolonged nutrient deprivation.[63] Meaning, it has low activation with daily eating and high activation with extended periods of fasting. CMA is known to become aggressively active at approximately 36 hours into fasting and remains at these levels until day 3 or until the body is brought out of starvation stress.

When autophagy is maintained for 5 to 7 days, macroautophagy and microautophagy shepherd materials, brought into the cell, for the UPS and CMA to degrade. These materials from broken down, non-functioning proteins like cysts, tumors, excess skin, AGE's and senescent cells are shuttled into lysosomes for degradation. This extended period of aggressive autophagy also activates the removal and restoration of new organelles.[16,64,65]

Dry fasting is the only way to produce a total whole-body cellular metabolic restoration. This destruction by chemical fire of your old body tissue also results in the building materials inside the cell to create new cells.

"In order to rise from its own ashes
a Phoenix first must burn."

- Octavia Butler

The wide range of autophagic function

Autophagy and the ubiquitin-proteasome system are now recognized as the critical housekeeping pathways in catabolism of diverse cellular constituents and internal structures such as:

Protein aggregates (aggrephagy)
Lipid droplets (lipophagy)
Iron complex (ferritinophagy)
Mitochondria (mitophagy)
Peroxisome (pexophagy)
Endoplasmic reticulum (reticulophagy)
Ribosome (ribophagy)

As well as secretory granules within pancreatic cells (zymophagy) and processes that rid the body of intracellular pathogens (xenophagy).

Autophagy and UPS dysfunction are associated with a variety of human pathologies including accelerated aging, cancer, heart disease, neurodegenerative disease and metabolic diseases such as diabetes.[54,57]

Activating autophagy by dry fasting on a regular basis can have desirable outcomes for longevity.

Chapter 5

Sirtuins and Viral Infection

"An ounce of NAD+ is worth a pound of cure."

-Pam McKenzie

Dry fasting is not advised during a viral infection and, in fact, it can make it worse.[116,117]

This section is complicated and much of the information presented has only been discovered in the past year. Viruses can infect vulnerable cells, like the epithelial cells of the respiratory system, in a series of steps to co-opt autophagic function. Currently, vaccines are the preferred method of treating viral infections by creating a way to stimulate antibodies. There may be a different way to defeat a virus, in the early stages of an infection, but this information has only been recently discovered.

Autophagy has retained an evolutionary ancient ability to eliminate most intracellular pathogens but some viruses have evolved to subvert autophagy. Viruses are ancient enemies and have unique adaptation capabilities to thwart our immune system and to co-opt autophagy. Viruses have evolved to utilize the autophagic machinery in specific ways that assure their survival at the expense of the host.

Yet, there is a way to help the autophagic machinery defeat a viral infection by improving your cellular NAD+ status.

A key function of autophagy, in antiviral defense, is the delivery of viruses to lysosomes for degradation but these ancient enemies are adaptive. Viruses have developed various ways to inhibit autophagy or even employ the autophagic machinery for maximal viral replication. This indicates that autophagy alone, as a defense against all pathogenic attack, might prove to be not so black and white.

Know the enemy and their methods

Today, there is a new family of RNA viruses that are similar to zoonotic strains; *e.g.*, those found from bats, pigs or birds. The questions of their origin arise from the glycoprotein-120 coating found on COVID-19 common to AIDS and Ebola; not found on other corona strains. This coating makes it able to bind to cells 100 to 1000 times stronger than MERS or SARS. Regardless of new strains and their abilities to thwart cellular defenses, all RNA viruses follow a known invasion strategy, once cells are infected. Understanding their strategies can reveal the way to prevent them.

How a viral attack begins

Host cell dysfunction, following infection with a virus, is always accompanied by abnormal increased intracellular Ca2+ concentration. The host cell plasma membrane is the first barrier against the invasion of viruses. Various Ca2+ channels and pumps are distributed on the cell membrane and these membrane proteins become the direct target of viral infection. This intracellular Ca2+ hijacking also affects

the movement of mitochondria, changing the distributed energy production locations inside the cell.

The level of intracellular calcium is one of the factors known to regulate mitochondrial motion. Mitochondrial outer membrane proteins are very sensitive to intercellular calcium concentration.

Mitochondria are highly dynamic organelles that are constantly in motion inside the cell to provide energy where needed. They move along the cells microtubule transportation system on long strings of tubulin proteins that construct a sort of super highway system inside the cytoplasm. Mitochondria are tethered to this system with motor proteins that 'walk' them along the highway. High intercellular calcium causes the release of the tether between mitochondria and the microtubule-based motor proteins, kinesin and dynein, thus reducing or stopping their microtubule-mediated movement.[125] Viruses benefit from mitochondria trapped in certain cellular locations for location-specific energy production or sequestration of the mitochondrial apoptotic machinery, to keep the host alive. In other words preventing mitochondria to participate in the destruction of a diseased cell. Viruses first hijack the host's intracellular Ca2+ system to achieve successful replication; in a way not easily suspected.

Why increase the cells' calcium concentration?

Higher than normal levels of calcium stimulate acetyltransferase to begin hyper-acetylation - placing acetyl groups on proteins and genetic codes.[110,111] This

immediately causes the early acetylation of α-tubulin on microtubules to stabilize the virus cytoplasmic replication compartments and in so doing stops mitochondria movement.[111]

Hyper-acetylation is thus employed to derail autophagy from challenging the virus by changing the internal structures of the cell. Acetylation subsequently increases microtubule bundling and creates a new transportation system that preferentially moves viral compartments to the endoplasmic reticulum for replication and viron assembly. Thereafter, this promotes transportation of replicated virus that are budding from the endoplasmic reticulum and need to be moved out of the cell, to the cell membrane.[111, 115, 116,124]

But that's just the pregame...

Hyper-acetylation is needed to tag and locate the subgenomic protein code start and stop transcription locations on the virus RNA- copy, in order to replicate. [112,113]

That's the pressure point for ending viral infection.

Without acetyl markers, as instruction tags for virus proteins synthesis, the entire virus replication operation abruptly ends. Ending the viral replication also ends the intracellular calcium imbalance, restoring the microtubule system and mitochondria motility. The deacetylation of the microtubule system can then result in the return of normal transportation in the cells. The deactivated virus

and its proteins can be moved to lysosomes and degraded without ever infecting another cell.

There is a way cells can perform normal deacetylation but it's a bit complicated because it involves understanding how viruses replicate in the first place.

I'll try to explain this as simply as I can.

Viruses have a complete package of codes to replicate

Two critical processes occur once an RNA virus, like COVID-19, gets inside the cell. The first is making transcription and replication polyproteins from virus RNA genome. The second is making copies of the complete genome and the subgenomic proteins that make the virus delivery shell parts; inner and outer shell and receptor spikes.

Penetration

Once a virus reaches the cell surface, the viral shell protein spikes stimulate receptors to trick the cell to open the cell surface. This stimulates the calcium pumps on the cell surface to increase intercellular calcium levels and, thereby, activate the host cell's acetyltransferase.

Once the cell membrane opens, the virus shell releases the RNA+ 'sense' strand into the cytoplasm. The RNA strand is rapidly acetylated (tagged) to allow the virus genome to be copied as well as sections of the entire code to be transcribed and replicated to also recreate the shell. The first copy is the genomic RNA- copy to make new copies of the original virus; the RNA+.

<u>Virus replication can't happen without acetylation.</u>

Instead of employing vaccines (with their known toxic adjuvants that potentiate their response) to address viruses, it's far easier and safer to just interrupt the machinery by removing the markers to stop the genetic replication of the invader; essentially neutering it.
The way the cells can do this is by stimulating the synthesis of a signaling molecule; NAD+.

NAD+ activates cytoplasmic SIRT2. Why is this important?

New understanding of the anti-viral role of sirtuins

The newest research in virology is in the field of sirtuins found in the nucleus and cytoplasm, SIRT1 and SIRT2, first elucidated in 2016 by Dr. Hanna Budayeva at Princeton University.[114] It's been further discovered that all sirtuins can impact the replication of DNA and RNA viruses.

SIRT2 is a class 3 host NAD+ dependent histone-deacylase (HDAC) found in the cytoplasm that regulates gene activity and regulates inter-cellular transportation along the cytoplasm micro tubule system.[114] Histone acetylation is catalyzed by histone acetyl transferases (HATs), whereas the reverse reaction is performed by histone deacetylases (HDACs). Simply put, NAD+ activated SIRT2 can remove acetyl markers anywhere in the cytoplasm, regardless of whether the host or the virus forces the host to place them on protein codes and microtubules, to restore normal cellular operation. But only if they have adequate NAD+ to become activated to do so.

Sirtuins effect on protein synthesis

Since sirtuins can deacetylate histones on both viral *and* host chromatin, their effect on viral replication may be profound in that they can prevent activation of viral replication by removing the acetyl targets for protein synthesis. Viruses are known to manipulate host epigenetic and transcription machinery by hijacking SIRT-regulated pathway's if there aren't enough NAD+ activated sirtuins to counter their attack at the beginning of an infection.

Sirtuins effect on intercellular transportation

NAD+ activated SIRT2 can act in antiviral defense at the immediate early stages of an infection by fighting the acetylation of the cell and virus RNA by removing acetyl markers and repressing viral gene expression through interactions with viral and host cell transcription factors and histones.

Sirtuins are the reason why we have been able to survive for millions of years while living with viruses. When the level of NAD+ activated sirtuins are not adequate to fight off pathogens, the pathogens win. Meaning that we are superior to all the pathogens depending on our cellular sirtuin status but sirtuins have to be activated by NAD+ to work.

NAD+ to the rescue

Subgenomic proteins are small sections of the total virus genome that need to be transcribed to make the viral shell. The code sections, to begin transcription, are marked with acetyl groups. When activated by NAD+, SIRT2 can remove

the acetyl groups placed on the virus RNA-strands. Without the acetylation to instruct subgenomic proteins synthesis, the virus can't replicate and is unable to re-infect another cell. SIRT2 removal of the acetylation markers on microtubules may also enable movement of neutralized viral parts to lysosomes for degradation.

"Therefore, being able to target sirtuins provides a valuable antiviral therapeutic strategy. Maybe the simplest way to control these RNA viruses is through regulation of NAD+ levels."

- Dr. Hanna Budayeva

Later in the book, I will discuss sirtuins in detail as they directly affect DNA repair. The short story is that starvation aka dry fasting up regulates NAD+ synthesis and NAD+ is essential for activating sirtuins *before you get sick*. The cells construct NAD+ from the essential amino acid tryptophan; sorely lacking in the modern diet, due to the actions of glyphosate on the food supply. Added to that, there is a competition for tryptophan; macrophages taking all they can find to destroy pathogens while the cells are trying to employ it to keep sirtuins activated.

If SIRT2 is not active for lack of NAD+, to allow the cell to shield against viral attack, the virus can take over the cells autophagic process to use for its own needs. Basically by stopping mitochondria movement and corrupting autophagy (the movement of pathogenic materials to lysosomes for degradation).

Simply put, raising levels of NAD+ is the keystone in the arch of shielding the cells from the actions a virus.

And this is clearly seen in the most recent COVID-19 pandemic as it prefers old people to young people.

Young people generally have more NAD+.

"The supreme art of war
is to subdue the enemy without fighting"
- Sun Tzu- The Art of War

Chapter 6

The Doctors Who Perfected Dry Fasting

"Extreme remedies are appropriate
for extreme diseases."
- Hippocrates

Dr. L.A. Shchennikov

Dr. Shchennikov patented his method of dry fasting in 1993: **"The Method of Rehabilitation of The Body."**
Dr. Shchennikov tested the technique on himself first. He repeatedly performed 7 & 10 day dry fasts and even

experimented with a 21 day dry fast. Through his research and supervising dry fasts on thousands of patients, he discovered that an 11 day dry fast is the optimal length of time to cure all conditions and that no further health benefits are achieved by fasting longer.[29]

He observed that during dry fasting the body absorbed moisture through the skin from evening air as well as through baths and water procedures without drinking any water. He recommends that during the fast to change the regime of the day somewhat - to walk at night to fill the body with moisture from the air. Baths are also needed and their duration can be very significant since the body starts sucking water through the skin creating a kind of counter flow of liquid into the body. Therefore, it is very important to perform the mode of taking 'air baths' by walking at night in cool moist air and periodically dousing. Splashing handfuls of water can be used 2 to 4 times a day using cool or cold water exclusively. In fact, being in the open air especially at night and dousing with cool or cold water brings tangible benefits and relief even on the first day of this method. The skin begins to 'breathe' by feeding on moisture since the body is absorbing in 'reverse' direction of excretion.

Dr. Shchennikov and Dr. Filonov both incorporate the earlier work of Sergei Ivanov in body 'tempering' to strengthen the body. They both suggest pouring cold water on the body to lower the cold threshold on the third day for hardening and strengthening the body. And like Ivanov, advises to perform these water procedures in the open air despite the weather conditions. So adherence to

the regime and being out in the open air and taking cool showers will bring you double results for health.

Dr. Shchennikov suggests this list for a successful dry fast:

-Remove food and liquid from view and do not think about them.
-Abstain from sexual activity.
-Breathe only with your nose, try not to talk, that is, carefully save energy. Strictly keep your mouth shut. Do not spit saliva, swallow it. It is advisable to refrain from mouth rinsing and teeth cleaning.
-Movements should be smooth, calm. Do not make sudden climbs, exclude unnecessary physical activity and effort.
-Use a cool shower (keeping your mouth closed).
-Be active but try to move slowly and calmly, do something easy: read, write, knit, embroider
-Be meek and humble, follow all the instructions gratefully.
-Wear a lightweight, breathable natural fiber clothing like linen.
-If possible, walk barefoot, which is a diuretic, expelling slags and toxins.
-At night (or) early in the morning go out in fresh air.
-Periodically ventilate the room which you are in and at night leave open a window or balcony door.
-Strictly follow the recommendations to safely end the fast.

According to Dr. Shchennikov it is advisable to start with a one-day dry fast lasting 24-36 hours once a week. Over the next 2-3 months you can increase the duration to 3-5 days. To cure serious illnesses you will need to fast for a period

of 9 to 11 days. It is advised to perform the 9 or 11 day fast under the supervision of a practitioner.

He also recognized that there must be a positive attitude toward success in order to attempt and complete the passage of a long course. You have to be confident in your abilities and as folk wisdom says: ***"A weak man seeks a reason, a strong reason works."***

He further reminds us that even though you can bathe and wash in water never forget that ***"as little as a drop of water taken into the mouth violates abstinence."*** During the abstinence, save energy, do not waste it on conversations.

By the 4th day reactions to dry fasting become evident. Blood pressure drops and the body temperature may rise. This is a physiologically normal phenomenon during 'The Healing Abstinence'. Chills or fever may occur depending on the condition of the patient and the symptoms of their disease. At this stage there is a redistribution of yin and yang energies and their interaction. For example, there is a decrease in the cold threshold and an associated normalization of thermoregulation processes, which can manifest as hot flashes that require the use of cold water to stabilize the patient's condition. However colds, pharyngitis, laryngitis, tonsillitis and rhinitis are cured.

By the 7th to 8th day there is usually a bad taste in the mouth, a coating on the tongue and a bad smell on the tongue but keep your mouth closed. The pulse rate may

increase to 120 or drop to 40 beats per minute. In some cases nausea, dizziness, weakness, accumulation of saliva, irritation in the throat or diarrhea is observed. Despite the fact that all these symptoms are unpleasant they do not pose any danger. They arise as a result of auxiliary processes of cleansing the body. Sleep becomes interrupted and sleeping partially disappears so it must be compensated by walking outside in cool air. Keep your mouth shut during sleep. Before going to sleep wear an elastic headband around the jaw so that the mouth does not open, continue this until the end of the course. Mentally monitor yourself to keep your mouth shut.

Slag Produced During Days 8 - 11

Urine collected from the 8th to the 11th day during a Shchennikov 11 day dry fast reveals how much slag is flushed out of cells.
These are the sequestered metabolic byproducts of digestion that cannot be normally eliminated.
This represents many years of accumulation.

Dr. Shchennikovs' method is proven to be effective for a wide variety of diseases in different age groups with a 95 percent success rate. His clinical results are nothing short of miraculous:

Conditions resolved with dry fasting

- ✓ General recovery and rejuvenation of the body
- ✓ Improves metabolism
- ✓ Strengthens a persons' faith in their abilities
- ✓ Improves thought processes
- ✓ Promotes spiritual development
- ✓ Cleanses: the skin, the digestive tract, the kidneys
- ✓ Promotes the utilization of diseased cells
- ✓ Dissolves stones in the kidneys and gallbladder
- ✓ Cleans vessels of cholesterol plaques
- ✓ Reduces high blood pressure
- ✓ Stage 3 and 4 cancers
- ✓ Metastases
- ✓ Improves the function of the lymphatic system
- ✓ Stimulates the immune system
- ✓ Activates the processes of toxin removal
- ✓ Acute renal failure
- ✓ Thrombosis
- ✓ Major focal myocardial infarction
- ✓ Pronounced body mass deficit
- ✓ Manic-depression
- ✓ Obsessive states
- ✓ Hereditary mental disorders
- ✓ Severe head trauma-severe concussion - only short courses of 1-3-5 days
- ✓ Encephalitis
- ✓ Toxoplasmosis
- ✓ Inflammatory diseases of central nervous system
- ✓ Cerebral palsy
- ✓ Cerebral tumors
- ✓ Hypothyroidism and thyrotoxicosis
- ✓ Chronic diseases of the cardiovascular system
- ✓ Hepatitis
- ✓ Bronchial asthma
- ✓ Angina pectoris
- ✓ Diseases of the nervous system
- ✓ Epilepsy
- ✓ Schizophrenia
- ✓ Condition after chemotherapy and radiotherapy
- ✓ Acute infections of kidney
- ✓ Hemophilia
- ✓ Thrombophlebitis
- ✓ Grade III heart failure
- ✓ Diseases of the inner ear

Dr. Shchennikov 11 Day Dry Fasting Method

In the words of Dr. Shchennikov...

Day 1 - Stop consuming all food and water
-Basically the first day passes unnoticed, if there is no first reaction of fear of hunger.
-Weight loss is from 1 to 1.5 kg.

Day 2
-Weight loss is 1 kg.

Day 3 - Entering first acidotic crisis
-The body switches to fat for water and nutrition.
Blood pressure varies depending on the characteristics of the body.
-Weight loss continues to 1 kg.

Day 4
-Pressure drops, body temperature may rise. This is a physiologically normal phenomenon with Healing Abstinence as virus and bacterial infections are defeated.
-Recommendations - do not be afraid of cold water, take a cold shower in the morning and evening. Strictly monitor that water does not enter the mouth!
-Weight loss continues to 1 kg.

Day 5

-The body's signal system is activated. The most affected organs have pains because at this time symptoms of hidden diseases appear, of which the patient may not know. By effort of will, and if necessary with self-massage, these symptoms are suppressed or diminished.
-Body temperature rises and the person feels the heat.
-Blood pressure may increase or decrease depending on the individual.
-You must take a cold shower, walk outside in cold air in light clothing or even without it in any weather. If there is snow, you can walk it barefoot.
-Weight continues to decrease by about 1 kg.

Day 6 - Exiting first acidotic crisis

-During this period, the sense of smell is significantly increased. Smells that were not felt before become bright and some even unpleasant. There may be an ache in the lower back from a long standing or sitting in one pose. The position of the body must be chosen individually and try to move more, avoiding sudden movements. Do not lie down except for short-term sleep during the day.
-Recommendations - to ventilate the room more often, go outside in any weather and temperature, it is better during rain or fog since moisture at this time is consumed through breathing and condenses in the nose. This moisture can and should be swallowed - the more the better. At night the desire to sleep during this period practically disappears.
-Weight continues to decrease by about 1 kg.

Day 7

-This is a period of relief, emotional recovery, stabilization of the body temperature and blood pressure, feeling of lightness, joy.
-Urine becomes a dark brown color as the body flushes out poisons.
-We must rejoice!

Day 8 - Entering the second acidotic crisis

-Usually there is a bad taste in the mouth and a bad smell on the tongue but you cannot open your mouth. The pulse may increase to 120 or drop to 40 beats per minute. In some cases the patient experiences nausea, dizziness, weakness, accumulation of saliva, perspiration in the throat and diarrhea. Despite the fact that all these symptoms are unpleasant they do not pose any danger. They arise as a result of auxiliary processes of cleansing the body.
-New symptoms - there is bitter saliva and irritability which you need to tame mentally.
-If there is a slight headache and low back pain it is necessary to kneel, touching the forehead to the ground and, if necessary, stay longer in this position. Thus the general condition of the back stabilizes, blood circulation improves and relief comes which makes it possible to relax lying down or sitting in a comfortable position.
-Movements should be slowed to avoid high blood pressure.
-Pain continues in the weakest, sickest organs which is the result of the process of their healing.

-Sleep - the night sleep partially disappears. It must be compensated by a night walk in the air.
-Recommendations - from 8th to 11th day drain urine into jars. Morning, afternoon and evening urine should be left in closed jars allowing to stand for 24 hours to see how much precipitation and slag is excreted from the body.
-Before going to sleep tie the jaw so that the mouth does not open and continue this until the end of the course. Mentally monitor yourself to keep your mouth shut.
-Weight loss continues to 1 kg.

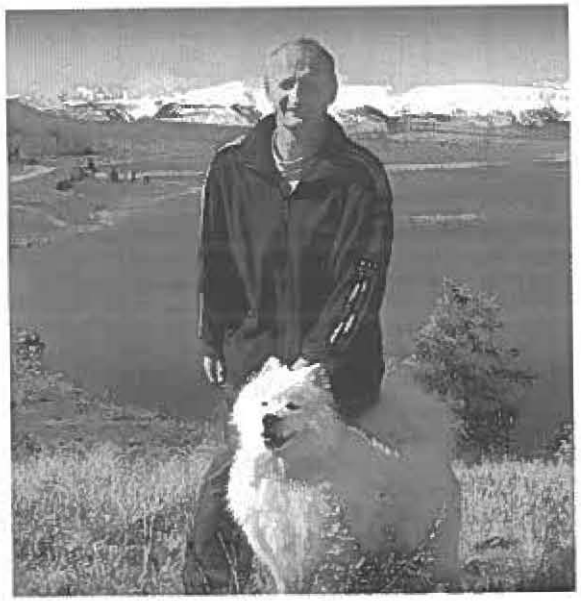
Day 9 - The moment of 'fracture'
-The head burns, the body temperature rises and there is a desire to cool it which is what it is necessary to do. There may be vomiting - a consequence of purification. Women can begin menstruation regardless of age and cycle. There is an intensive release of waste products through the urine. Coldness of hands and feet is observed, the soles of the feet and palms whiten. Heart palpitation is increasing.
-On this day there is a turning point in the struggle of the whole organism, aimed at renewing and purifying the blood. In some cases the pulse may not be audible but you should not be scared as it should be so.
-The mouth becomes sticky but keep your mouth closed by making circular movements clockwise and counter-clockwise with the tongue, touching the gums that produces saliva that must be swallowed.
-Recommendations - to continue cooling the body with cool, cold air or water.

Day 10 - End of second acidotic crisis
-State of indifference as time seems to drag on slowly.
-The organism at this time has overcome the second acidotic crisis. The work on cleansing the blood and healing the whole organism continues successfully but boredom becomes an issue. Try to distract yourself with something (walking, reading, knitting, light types of occupational therapy).
-Continue the gymnastics of the tongue with the mouth closed.

Day 11 - The last stage before the release
-Stay with the program to the final hour started 11 days ago.
-Carefully and leisurely prepare for acceptance of food, given all the recommendations for the exit.
-Completion of the course.

Day 12 - Fast is over and time to exit
-A very important stage - the completion of the course of Healing Abstinence infers that you have followed the strict instructions set forth by the author!
-This is a crucial moment which requires special stamina and consciousness.

Dr. Sergei Filonov



Dr. Sergie Filonov and his dog

"I had a dog and he would often run away from home for various reasons, sometimes for a long time. Once he came home very skinny and hungry it was obviously that he had not eaten any food. On another occasion he was hit by a drunken motorcyclist. When I examined him he was in poor condition but most interesting is that he crawled into the dark barn and refused all food and water. His injury was primarily edema and he instinctively knew not to eat or drink. For seven days he stayed in the barn. It was only on the eighth day that he began to eat and drink water. He had made a full recovery."

"Sometime after that I got acute sinusitis. The pain was hell. When I tilted my head down it brought me to tears. My reasoning was that such pain was primarily due to edema because there was no swelling. Then I remembered my dog and his edema. I decided I'll starve without water until the pain passes. After the fifth day the pain was gone after I had gone through all the symptoms of the disease. This was my first dry starvation. This is how I came to believe that absolute fasting was effective and developed the technique for people"

-Dr. Filonov

Dr. Filonovs' method is very similar to Dr. Shchennikov. Both promote walking outside in nature to allow the skin to absorb moisture from the air as well as sitting in cold mountain streams to moderate the effects of fasting as it progresses. He has outlined what you can expect from a properly performed Anhydrous Starvation Therapy: [30]

An Intense Release of Stem Cells into the Blood which Activates Regeneration and Rejuvenation Processes

The body is able to self-regenerate and self-rejuvenate. These processes are launched under the influence of stem cells. During dry fasting a process of intense body cleansing is initiated as the body rids itself of sick and old cells creating space in tissues for new stem cells. Stem cells are propagated and released into the blood in higher volume to occupy these vacated spaces, thereby performing regeneration and rejuvenation of old organ cells with new ones. An experiment was conducted at the Cryocenter headed by Y. Romanov, a Doctor of Biology. His

patient Yuri Guscho fasted a week. After one week of preparation and a recovery period of three weeks, the number of stem cells had dropped by the end of the 7th fasting day but during recovery it soared. This experiment proved that after fasting the body triples its production and release of stem cells; an effect that lasts for several months. It turns out that the regular practice of dry fasting can extend life and youth by 15 - 25 years.

Removal of Edemas, Tumors and Inflammation

Dry fasting forces the body to obtain water from cells. This is why the body's 'superfluous' tissues (fat deposits, edemas, tumors) are eliminated faster than in the case of water fasting. During dry fasting metabolism changes fundamentally in three stages. 1. Psychological hunger passes in one day. 2. On the third day the body's metabolism enters a ketoacidosic state to perform cleansing and pathogenic healing. 3. Between the 9th and 11th day there is a second ketoacidosic crisis which performs chronic disease healing. During dry fasting a body goes into a state of autolysis faster than in the case of water fasting. In autolysis a body looks for energy reserves inside itself. The body starts by burning everything that is superfluous and harmful in the body: fat, tumors, cysts and inflamed tissues. During dry fasting cells split faster as the body's need for both nutrients and water increases. The longer the fast is prolonged after the second crisis the longer it remains in a state of autolysis and the more effective the process of splitting unnecessary tissues is. That is why it's important to reach

an acidotic crisis as quickly as possible which is achievable thanks to dry fasting.

Informational Purification of the Body with Endogenic 'Water of Life'

During dry fasting a process of intense cleansing begins as toxins are eliminated. Purification can only take place by NOT ingesting exogenic (external) water and occurs with the cleaner high-quality metabolic water synthesized by the body. Under the extreme conditions of dry fasting, the body must activate production of its own endogenic water and only healthy cells are able to do that. Weak and sick cells are unable to produce the 'water of life' and are selectively removed. However, this is not the most important part of the process in replacing exogenic with endogenic water. Endogenic water synthesized by the body is free from external negative information. Basically 'dead' water is replaced with 'living' water while the negative information held in exogenic water is eliminated. Without the impact of negative information held in external exogenic water, blood and lymph are purified intensively through a sort of internal filtration process. Renewal of lymph and blood during dry fasting takes place thanks to endogenic 'water of life.' As a result, at the end of dry fasting, two of the body's most important fluids become almost completely pure. Correspondingly all the body's tissues through which blood and lymph circulate are purified of external content.

This **phenomenon of purification** is one of the main advantages of dry fasting. This effect cannot be achieved

by abstinence from food only. This unique mechanism eliminates all the negative content that enters the body via 'external' water which cannot be achieved through of any other kind of medical fasting.

Improvement of Immunity by Reducing Inflammation

During dry fasting, the body has a more powerful immune response and can fight inflammation more actively. All inflammations are fed by water which is clearly demonstrated by the edemas containing pus and lymph that form near wounds on the body. When the body is deprived of an inflow of exogenic water it uses endogenic water very carefully; only for feeding healthy cells. Damaged cells as well as various bacteria, viruses and parasites suffer from a lack of external water and die. During dry fasting people often get a fever. The increase in body temperature that takes place during medical dry fasting leads to the creation of a strong immunologic response. Fever during dry fasting is very good as it indicates that the body is fighting infections. Each cell in the body is turned into a kind of small furnace or reactor and the toxins inside it are destroyed. If a cell is too damaged it's eliminated completely. The concentration of biologically active substances in bodily fluids also increases. These include immunoglobulins and immunocompetent cells. The production of interferon rises, anti-tumor and anti-viral activity increases, T-cells proliferate, the bactericidal capacity and phagocytic activity of neutrophils increases, the cytotoxic effect of lymphocytes grows and the growth and virulence of microorganisms decreases.

Thorough Cleansing without Supplemental Treatment

There is no need to combine dry fasting with enemas, saunas and other hydrotherapeutic procedures. In fact, the use of these supplemental treatments is not recommended. During dry fasting toxins are effectively removed from the body thanks to 'live' endogenic water. Many people appreciate that dry fasting does not require the use of enemas or hydro colon therapy. We have already mentioned that body temperature rises during dry fasting. This mechanism not only increases the body's immune response it also turns each cell into a tiny nuclear fusion reactor which destroys everything that is superfluous, harmful or foreign.

Intensive Weight Loss Not Muscle Loss

Metabolic changes in the course of dry fasting facilitate effective weight loss and long-term weight stabilization. Fat deposits are burnt three times faster during dry fasting than during water fasting. Another advantage of dry fasting is that the fat tissue does not fully regenerate after the fast. This is because dry fasting is anti-angiogenic due to the selective removal of superfluous tissue, like excess angiogenic blood vessels, that were created to fill fat cells. The third important advantage is that dry fasting burns mostly fat due to the transformation of fatty acids to make endogenous water because you are not adding exogenic water for metabolic processes. Since 90% of fat cells are water, in the form of fatty acids, they disintegrate 3 – 4 times faster than muscle cells during dry fasting because they represent a higher caloric value as fuel. As a result weight loss and toning takes place. The body becomes

slimmer and suppler. Finally, dry fasting is less expensive. In fact in every respect it's nearly free. There is no need for special foods, meals or medicines. Dry fasting does not result in the significant loss of muscle mass and is therefore the best way to treat obesity.

Whole Body Rejuvenation

Dry fasting has an incredible rejuvenating effect since it can force the body to eliminate weak and damaged cells that cannot withstand the extreme conditions of autolysis. Cells become stronger resulting in 'healthy offspring' once they divide or are replaced with a brand new cell from stem cells. The skin, hair and nails glow with health and youth. Submitting the body to the extreme conditions of dry fasting launches the mechanism of selective removal; an internal fight between the body's weak and strong cells in a competition for scarce resources. Strong, healthy and well-functioning cells remain and are increased in number. This new ratio of strong cells pass on this strength by producing new generations of healthy cells reducing the amount of 'junk' cells in the body creating a body regenerated and rejuvenated by process of elimination.

Effective Prevention of Oncological Diseases

Experimental research has shown that dry fasting is an effective means of disease prevention including oncological disease. The experiments by Professor Y.S. Nikolayev on white rats demonstrated that animals subjected to dry fasting after exposure to radiation are far less likely to develop blood cancer than the other rats. The experiment was conducted at Stavropol Medical Institute

where 120 white rats were divided into 4 groups. All of them were inoculated with sarcoma. As a result of the experiment there was a 0% survival rate for all the animals from the control group that were not fasted. The first group, inoculated before fasting had a 50% survival rate; in the second group, inoculated during fasting had a 66% survival rate. In the third group where inoculation took place after breaking the fast there was a 100% survival rate. A similar experiment was conducted in the USA. Rats were exposed to radioactive irradiation which caused blood cancer in all animals within the control group. In the experimental group where rats fasted the percentage of sick animals was 70% lower. It might seem that after fasting the body would be weak and defenseless against illnesses but in fact the opposite is true: having eliminated weak and damaged cells during fasting the body is stronger in fighting illness.

Regeneration of Energy, Purification of Energy Channels

In the course of dry fasting the body's energy is renewed. Brain activity increases, creative abilities emerge and the soul achieves a state of harmony. Will power strengthens. Dry fasting involves spiritual work and provides spiritual results that are equally astonishing; negative information is removed, negative energy is eliminated, energy channels are cleansed and chakras are opened. The fever experienced by a person in the course of dry fasting affects not only damaged physical tissue but also negative energy. Some of this material is burned and some leaves the body unable to withstand the extreme conditions of dry fasting. Areas filled with 'hard', 'dead' water – pathological parts

of the body where negative energy is concentrated – are resolved. These negative information areas appear long before the symptoms of an illness manifest. As a result of dry fasting 'hard, dead' water disappears replaced by 'live' endogenic water synthesized by the body. Pathology disappears along with the underlying causes of various diseases but remarkably psychological problems are resolved.

A Rush of Energy - Increased Energy Reserves

Participants emerge from the dry fasting process with new reserves of energy due to brain and neural tissue restoration and regeneration of mitochondria. They need less sleep and function more effectively. This seems counter intuitive: it would seem that a person who doesn't eat or drink would lose energy instead of gaining it. But this is no paradox. The body draws energy from its surroundings. The intensity of this process during dry fasting is even higher. After breaking a dry fast the body begins a process of super-regeneration, accumulating energy and creating energy reserves. The purification of chakra energy channels during dry fasting allows a person to receive energy from the environment freely. The body itself, cleansed of blockages, is able to accumulate more energy than before the fast. After the dry fast is broken the body is overflowing with energy: 4-5 hours of sleep is enough, a person becomes highly productive and feels alive, optimistic and energized.

Dr. Filonov has also had remarkable clinical results using dry fasting to heal a wide range of conditions:

Conditions resolved with dry fasting

- ✓ Ovarian cysts
- ✓ Uterine fibroids
- ✓ Endometriosis
- ✓ Infertility
- ✓ Mastitis
- ✓ Hot flashes
- ✓ Yeast infection
- ✓ Parasite infection
- ✓ Viral infection
- ✓ Bacterial infection
- ✓ Benign tumors
- ✓ Rheumatoid arthritis
- ✓ Osteoarthritis
- ✓ Psoriasis
- ✓ Interstitial cystitis
- ✓ Chronic pyelonephritis
- ✓ Prostatitis
- ✓ Prostate adenoma
- ✓ Inflammation
- ✓ Gangrene
- ✓ Atopic dermatitis
- ✓ Chronic urticaria
- ✓ Eczema
- ✓ Ankylosing Spondylitis
- ✓ Asthma
- ✓ Chronic pneumonia
- ✓ Pulmonary Sarcoidosis
- ✓ Atherosclerosis
- ✓ Hypertension
- ✓ Sciatica
- ✓ Herniated disk
- ✓ Brain injury
- ✓ Migraine headaches
- ✓ Gastritis and disorders
- ✓ Stomach ulcer
- ✓ Duodenal ulcer
- ✓ Pancreatitis
- ✓ Cholecystitis
- ✓ Ulcerative colitis
- ✓ Irritable bowel Syndrome
- ✓ Hemorrhoids
- ✓ Non-insulin dependent diabetes

Dry Fasting For Radical Life Extension

"I don't want to achieve immortality through my work, I want to achieve immortality through not dying."
- Woody Allen

Chapter 7

We Can Win a Losing Battle

"Winning isn't everything, it's the only thing."
- 'Mac' McKenzie

It's time to draw on the scientific research, in the reference materials, to explain why I think it's possible to radically extend lifespan. Several metabolic chemical reactions occur simultaneously, during a dry fast, that do more than just repair cells. Processes that rely on enzymes triggered into active or inactive states and hormone secretions occur that may allow us to break the death barrier.

I have coined a new term: functional immortality. It's not immortality from a magic elixir, it's from a deeper understanding of the chemical functionality of the human body under nutrient stress. The body is a complex chemical organism, operating after embryogenesis, with a subset of original instruction cells that can be called upon to replace old cells with immortal cells - stem cells.

Functional immortality is a condition where the body has been functionally restored, making it too young to die from old age.

You're about to see something, in a way, that no one else has ever thought possible.

"The real voyage of discovery consists not in seeking new landscapes but in having new eyes."
- Marcel Proust

Aristotle said the whole is greater than the sum of its parts. And the life force and the physical body are just that.

The body is a coordinated system of functioning organs that are each a subsystem guided by the expressed DNA protein codes on their local cellular histones. The body works in harmony because all the cells in the body have the same master DNA protein code library, to perform the symphony of life; the human genome.

Temporal control is maintained in each subsystem organ by only being able to make a portion of the total DNA code to make their precise subset of operating system proteins; only a book from that larger library.

If a page is torn out, words are changed or misspelled or a new page is inserted, it's no longer the same book. Then the story changes or is unreadable and organs trying to read the damaged book age, malfunction and ultimately the life force leaves the physical body behind.

We are cells; cells fight our war against death

A battle is waged daily to repair damage in an effort to stay alive and it's a battle that's waged at the cellular level.

Our cells have the ability to repair all the damage but these abilities are rarely activated. Sadly, because the full repair capability is only infrequently active, these systems are only able to delay death; they can't prevent it.

Cells rely on a number of pathways to ensure that the damage to DNA, induced by endogenous and exogenous reagents, is repaired. The cells have layers of systems to repair damage to their DNA in an effort to keep us alive.

Remarkably, dry fasting can activate these repair

systems to restore cellular function in unique ways to win the war.

However, as Sun Tzu reminds us from *The Art of War*:

> *"If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle."*

We know the enemy; the enemy is death. The battle for life is fought inside the cells. This is how the cells try to fight that battle...

Telomere loss

Cells have the ability to divide to stay alive and repair adjacent tissue, but can only do it so many time before they can't.

In 1938, Herman Mueller discovered telomeres. He found that the ends of each chromosome are protected from damage by repeating sequences of non-coding DNA. Then in 1961, Leonard Hayflick discovered that a normal cell can only divide 40 to 60 times; the Hayflick Limit. In 1971, Russian biologist Alexei Olovnikov recognized that chromosomes could not completely replicate their ends. To accommodate Leonard Hayflick's idea of limited somatic cell division, Olovnikov suggested that DNA end sequences are lost every time a cell replicates until the loss reaches a critical level, at which point cell division ends. These discoveries were then able to explain why cells stop dividing.

DNA protein codes are constructed as sequences of 4 amino acids; Adenine, Guanine, Thymine and Cytosine in the chromosomes. The chromosomes are protected by these end caps; telomeres. Telomeres are much like the plastic end on a shoelace, to keep the lace from fraying. Telomeres are comprised of 3 of the 4 amino acids; Thymine, Adenine and Guanine in a specific sequence - TTAGGG. Telomeres are repeating nucleotide sequences at each end of a chromosome: TTAGGG-TTAGGG-TTAGGG-etc.

This repeating sequence protects the ends of the chromosomes from deterioration and from fusion with neighboring chromosomes. Telomeres are designed to be lost. The number of repeating TTAGGG telomeres on the end of chromosomes is repeated approximately 15,000 times in the womb and that number is reduced to 2,500 times at birth. The number of telomeres is reduced even further, during the growth phases from infant to adolescent to adult, as cells divide. It is unavoidable that telomere sequences are lost each cell division and at a point there are too few of them to enable replication. Once a cell can no longer replicate, its functionality slowly reduces and it transforms into a zombie-like phase; senescence. It then begins secreting pro-inflammatory cytokines that damage surrounding cells, like the bad apple in the barrel, until it either dies or is removed.

Telomerase

Telomerase is an enzyme that can wrap around the end of a chromosome to build new TTAGGG amino acid sequences onto the ends of chromosomes.[31] In most

human somatic cells, except for stem cells and lymphocytes, telomerase activity is diminished after birth and telomere length shortens with each cell division.[36] It's hyper active in cancer cells but not active at a level in normal cells to replace the telomere loss rate. However, this means that the Hayflick Limit of cell divisions is not a limit in every case. Meaning, if you can add telomeres back onto to the ends of chromosomes, you can break the Hayflick Limit.

Paradoxically, by the time the cell reaches the zombie phase, the DNA code may have had so much methylation damage that telomere loss is not a factor in its inability to replicate. The loss of telomeres during mitosis is only one reason cells can't divide. The accumulating damage from DNA repair inside the cell can also stop replication.

DNA damage repair

DNA can be repaired by a number of excision enzymes.

The structural integrity of DNA molecules is necessary for their information storage function.[32] The Base Excision Removal (BER) pathway is a way the cells can repair damaged DNA, to prevent apoptosis as well as senescence.

As I said before, cells rely on a number of pathways to ensure that the damage to DNA is fixed. The cell has the ability to construct enzymes that fix and repair code lesions and violations.

AlkD glycosylase, a base excision enzyme, removes a damaged nucleobase by cleaving a glycosidic bond. Unlike many other base excision enzymes, AlkD does not flip a damaged nucleobase like AAG (a similar base excision

enzyme) enabling excision of bulky lesions (large segments of DNA damage).[33] Unlike other glycosylases, AlkD captures the extrahelical lesion (the damage attached to the DNA) to repair breaks, conformation violations and amino acid code sequence violations, that sometimes occur after DNA opens to transcribe a code sequence, during re-wrapping back onto the DNA strand. The enzyme wraps around the unspooled gene strand, during cell division, replacing incorrect amino acid inserts with corrections and the DNA comes out restored.

But this is a rarely activated repair mechanism and is not contributing to lifespan in any meaningful way.

Deuterium accumulation

Deuterium can slow the production of ATP. Deuterium (heavy hydrogen) is a hydrogen atom bonded to a neutron making it twice as heavy as hydrogen. Mitochondria create ATP; the energy for life. The electron transport chain machinery that creates ATP can be affected by deuterium when it replaces normal hydrogen. Deuterium is twice as heavy and slows down the production.[34,35] The bigger concern about deuterium is not its presence but rather its accumulation. Deuterium exists in the body naturally and it's involved in growth, energy storage and metabolism.

An excess of deuterium can change three-dimensional structures in the body creating misshapen proteins and lipids that don't function properly. Triglyceride is the combination of glycerol and fatty acids found in fat cells. Fatty acids are chains of hydrogen and carbon. The hydrogen in the chain can be replaced by deuterium and

expose the mitochondria to deuterium when free fatty acids are used for the production of ATP.

ATP keeps the lights on but if the lights dim, cells can run out of the energy to function normally.

You can have your deuterium level tested. And incidentally, dry fasting is the most effective way to rapidly lower deuterium levels. Deuterium is found in water and one way to reduce your exposure to it, is to freeze water and remove the first crust of ice. The deuterium in water freezes first so pour the non-frozen water into a container and discard the ice.

Senolytics - a new weapon to fight the war

Senolytics is an emerging field of research that identifies phytochemical compounds to eliminate senescent cells and neutralize their pro-inflammatory cytokines.

It has been discovered that Fisetin, a naturally occurring plant flavonol, has the ability to specifically target and eliminate senescent cells. Fisetin has been proven to have the most potent senotherapeutic effect on senescent cells and is the most effective at reducing senescent markers.

In a recent Newsweek article, the director of the Institute on the Biology of Aging and Metabolism at the University of Minnesota, commenting on the selectivity of Fisetin to target senescent cells said:

> *"It turns out that Fisetin is a natural product that actually we were able to show very selectively and effectively kills these senescent cells or at least dials back their bad secretions or inflammatory proteins."*

The most interesting finding is that Fisetin can pass the blood brain barrier to also eliminate senescent cells in the brain. This has the effect of dialing back the immune response in the brain as well as improving cognition.
Fisetin has been shown to be safe and there is no evidence to date for either short or long-term toxicity. And, more importantly, no adverse effects of Fisetin have been reported, even when given at high doses.

Since senescent cells are a hallmark of aging and age related diseases, it's a good idea to eliminate them and to dial back their toxic secretions. As I said previously, senescent cells damage surrounding cells, like the bad apple in the barrel, leading to more senescence.

Although dry fasting removes senescent cells, the Phoenix Protocol employs Fisetin, prior to fasting, to further improve senescent cell removal. Regardless of whether you are going to follow the protocol or not I highly recommend that everyone take ***Fisetin*** to clear their senescent cells (*see page 131*).

Resveratrol - a perfect weapon to fight the war

"About 20 years ago we found a set of genes that controls aging. Those genes are called sirtuins and there are seven of them in our bodies. And what they do is that they protect all organisms from deterioration and disease. Then we found out that resveratrol is like the accelerator pedal for the sirtuin genes and stimulates NMN, nicotinamide mononucleotide, to make NAD because sirtuins don't work without NAD. We also found that by the time you're 50 you only have half the level of NAD that you had when you were

20. When you give resveratrol to mice we found out that they lived longer and were super healthy."

- Dr. David Sinclair

It's been shown in humans that resveratrol induces a dose dependent increase in activity of the NAD+ synthetic enzyme nicotinamide mononucleotide adenylyl transferase (NMNAT1), a central enzyme in NAD biosynthesis. Activation of NMNAT1 by resveratrol in cultured primary human astrocytes and neurons increased NAD+ levels by 5 fold.

Resveratrol, therefore, indirectly activates longevity enzymes and the active form, trans-Resveratrol; a potent antioxidant that reduces the effects of aging on cells and cell components including cardiovascular epithelium, mitochondria, organs and brain cells.[118]

The most important role of resveratrol is its ability to raise levels of NAD+ after DNA repair.

DNA damage is first identified by an enzyme called PARP that requires NAD+ to work. PARP (Poly (ADP-ribose) polymerase) has a critical signaling function at DNA damage sites that dictates the chromatin structural organization to determine which DNA repair pathway is promoted to perform DNA repair. Complex DNA damage induces robust PARP activation and robust NAD+ depletion. Employing resveratrol to restore NAD+ levels keeps the cells protected on many fronts.

Additionally, PARP's cell-wide hyperactivation also downregulates ATP production because it also consumes NAD+ found in mitochondria needed to make ATP, shifting the metabolic reliance to enzymes to maintain energy

production. This is critical for damaged cell survival during repair but alters the mitochondria oxygen consumption rate and extracellular acidification ratio. Restoring NAD+ levels returns normal ATP production in mitochondria, reduces extracellular acidification and restores normal oxygen consumption levels.

The body has an innate NAD+ salvage pathway designed to restore NAD+ levels after PARP is used for genetic repair signaling but as people age the salvage pathway is reduced in effectiveness. This is mostly because the NAD+ precursors, needed for NAD synthesis, are reduced due to insufficient dietary intake and normal loss over time. Like a bucket with a hole that drips 3 drops for every 2 drops added back, over time the loss rate exceeds the replenishment rate. Resveratrol supplementation can reverse this age related trend.

It has been shown that the antioxidant protective effects of resveratrol administration are linked to improved mitochondrial function and a reduction of oxidative stress.[119,120,121]

As indicated here, as well as in an earlier section on viral infection, the most important action of resveratrol is its effect on raising NAD+ levels.

Since SIRT1 requires NAD+ to perform its gene silencing function as a deacetylase, higher NAD+ levels will invariably enhance SIRT1 activity. This finding suggests that resveratrol may not only promote SIRT1 function but all seven sirtuins by enhancing NAD+ synthesis, in whole-cell systems, without it being required for direct sirtuin activation.[122]

Therefore, by using resveratrol to increase NAD+ levels, it can influence a myriad of cellular processes including mitochondrial biogenesis, transcription and organization of the extracellular matrix.

Naturally this makes NAD+ is a major player in skeletal muscle development, regeneration, aging and disease. The vast majority of studies indicate that lower NAD+ levels are deleterious for muscle health and higher NAD+ levels augment muscle health.

As stated earlier NAD+ is critical for the activation of sirtuins to deacetylate cells during viral attack to prevent viruses from corrupting autophagy for their replication.

As we get older it's essential to use resveratrol because it has a unique whole-cell effect on all 7 sirtuins by raising the level of NAD+ at all times. As I said earlier, young people have more NAD+ than old people.

This is the reason young people don't get the diseases of aging.

The genetic clock

It should seem obvious that, after reading the information in this chapter, the accumulated damage to DNA sets the time on the battlefield to fight the war against death. All the pills, potions and diets can only slow the pace but never win the race.

Your time on the battlefield is certainly affected by the luck of the draw of genetic variation but after that genetic role of the dice, your personal habits and lifestyle choices can affect the length of time you stay in the fight...but only for a while.

But consider this:
Be it worms, whales or humans, lifespan is only based on the functionality of DNA.

...No matter what species you are.

Yet damage done to DNA during life can shorten lifespan

...No matter what species you are.

It's only logical that if basic lifespan is shortened by DNA damage, then lifespan can be lengthened by DNA repair.

Chapter 8

Aging and Age Reversal

"You are never too old to become younger!"
- Mae West

This is another complex chapter because it discusses DNA methylation. I'll do my best to keep it simple.

Methylation is a process whereby methyl groups, a combination of carbon and hydrogen atoms (CH_3), bond to DNA at a promoter site. In genetics, a promoter site is a region along the DNA helix backbone that identifies the location to open the DNA to read a particular gene; usually near the amino acid cytosine. When methyl groups attach along the helix, they stick out like a thorn on a rose bush. When they are located at a gene promoter site, they act to repress gene transcription. This is why methylation is the primary cause of aging. These methyl groups can prevent a wide range of proteins from being created, and making proteins is how we stay alive.

Methylation occurs on two of the four amino acids in DNA; cytosine and adenine. In some cases, methylation is essential for tissue-specific gene expression.

Differentiated stem cells develop a stable and unique DNA methylation pattern that regulates their tissue-specific gene transcription. In this case, it's not bad. But in the brain, for instance, when DNA is methylated as a result of environmental toxins, drug exposure or neural

injury, methyl groups left at promoter sites change gene expression and mental impairment is a common side effect. In this case, it's very bad.

Demethylation is the key to return cellular function and reverse aging.

Signs of methylation

The signs of aging are symptoms of the effects of these thorns on the DNA and its effect on the number of different proteins a cell can or can't make. It's seen as less elasticity in the skin, more wrinkles, failing eyesight, cognitive dysfunction, more aches and pains. Old cells can't make all the proteins that a young cell can. That's why old people look old. Old people have cells that have accumulated so many of these 'thorns' that their cells can't function as young cells anymore.

These thorns are epigenetic markers that build up in a very linear and predictable way. The DNAm, GrimAge and AgeAcclGrim tests are lifespan predictor tests that use the accumulation of these markers to calculate how long a person has left to live.

Being able to remove these artifacts of repair is critical for maintaining tight control of protein codes that maintain cell and organ functionality. Once signs of aging are evident, a body already has billions of cells with trillions of artifacts that must be removed to restore youth. Therefore, it's important to conduct a system-wide removal sooner than later and, unfortunately, no dietary means can achieve this level of restoration. However, dry fasting activates the cellular and autophagic repair systems

that can demethylate DNA and, furthermore, target weak and damaged cells for removal altogether.[30]

There is little doubt that removing these markers is a critical step to achieve radical life extension. I will show later that if they are not removed, lifespan can't be radically lengthened.

Exceptionally long lived individuals (ELLI's) have a low amount of these markers.[105] When we're young our cells also have very low amounts of these markers. Youthfulness is the measure of a low amount of repair markers and 'youthfulness' is the reflection of the ability of cells to make every protein needed to express their total functionality. When we're young we haven't been alive long enough to accumulate enough markers to see a visible or functional difference as it relates to aging.

There is no reason to think that we can't restore youth by returning our cells to this earlier level of functionality. Aging can be arrested so long as we maintain this level of genomic cleanliness.

The way to conceptualize this problem is to imagine a life raft being loaded down with small lead weights. Each individual weight isn't enough to sink the life raft but it's only a matter of time before there are enough weights to do so.

Similarly, over time DNA methylation markers accrue and are like the small lead weights in the analogy above. Except in this case, as the number of methylation markers accumulate, they are transferred over and over to a series of new cells.

All the methylation markers, created during the life of a cell, are passed on when it divides. The methylation markers, created during the life of the next generation cell, are added to the inherited methylation markers and the sum total are passed on to the following generation and so on and so on. They build up in this way, over years, forcing later generations of cells to express the signs of aging, as these loaded down cells struggle to maintain some measure of metabolic function.

It should be easy to see that by the time people get old, their cells have accumulated generations of repair artifacts. Notwithstanding personal habits and dangerous lifestyles and their possible life-shortening outcomes, the accumulation of repair markers on DNA cause cellular dysfunction that accelerates aging and inevitability leads to death.[103]

Or so we thought...

NAD+ (Nicotinamide Adenine Dinucleotide)

In 2016, Dr. David Sinclair discovered a previously unknown role for the signaling molecule NAD+ that explained why our ability to repair methylation dwindles over time.[39,40]

NAD+ is now known for its role as a controller of cell damaging oxidation by activating sirtuins, especially the ones in the nucleus of cells. Dr. Sinclair found epigenetic modifications by 5mC-methylation of cytosine could be demethylated by NAD+ activation of SIRT6. Meaning that a 'thorn' located at the amino acid cytosine, near a gene promoter site, could be removed by activating a sirtuin.[102]

This breakthrough revealed that maintaining adequate levels of NAD+, for sirtuin activation, is essential for fighting aging. It was also a key missing puzzle piece to understand how to arrest aging, since methylation increases with age: 43% methylation in the 9 to 19 age group increases up to 66% in the 20 to 79 age group. NAD levels decrease with age and these age group differences may correlate to the slow reduction in NAD+ levels in the 20 to 79 age group. This correlates to a reduction in the amount of activated SIRT6 to keep methylation in check.

Of the seven identified mammalian sirtuins, SIRT6 depletion is associated with severe symptoms of premature aging. So now we know that SIRT6 is the correct fighter to battle aging.

As discussed in chapter 4, NAD+ is recycled in a complex salvage pathway. Adding dietary supplements like nicotinamide riboside, trans-resveratrol and quercetin can increase NAD+ levels to fight its loss in the 20 to 79 age group.[109]

Sirtuins

Sirtuins have been shown to regulate lifespan. There are seven different sirtuins; they're found in different locations in all cells and control just about everything. Sirtuins are a keystone in anti-aging. They participate in multiple diverse processes including cell development, apoptosis, stress tolerance, embryogenesis, differentiation, proliferation, metabolism, hormone responses and aging.

Each of the seven sirtuins have a catalytic domain region for NAD+ activation that act like a key and a lock; a location on the molecule where NAD+, when attached to it,

can allow the sirtuin to activate enzymes and processes. NAD+ is essential to enable SIRT6 to activate the enzyme pathway for removing methylation marks on active DNA.[41] When sirtuins in the nucleus are activated by NAD+, they can then influence a wide range of essential cellular processes and enzymes.

The enzymes involved with longevity are called 'base excision enzymes'. These are needed to clean DNA and mainly target histones and transcription factors which we'll get into in a moment.[41] Their removal of these methylation 'thorns' can restore accurate protein code transcription, leading to the restoration of youthful metabolic function in old cells and their mitochondria.[42]

And as it turns out dry fasting up regulates NAD+ synthesis to enable sirtuin activation in any age group.

The enzymes that establish, recognize and remove DNA methylation are broken into three classes: writers, erasers and readers. We are interested in the erasers because they modify and remove the methyl groups.

Active DNA demethylation can occur in both dividing and non-dividing cells. It requires enzymatic reactions to process the 5mC-methylation at the promoter site at cytosine in order to revert it back to a naked cytosine.

Demethylation occurs through a series of chemical reactions that modify 5mC into to a condition that is recognized by the base excision repair pathway to replace the modified base with naked cytosine. The methylated region is then able to be removed altogether and replaced with new cytosine. The removed methylated section is

taken by chaperone mediated autophagy into a lysosome and digested for reuse. Waste not, want not.

The Base Excision Removal Pathway (BER)

Dozens of base excision enzymes are available to cut open DNA to replace methylation damaged sections, thereby removing methylation markers. Afterwards, they tidy up the site so it no longer affects mRNA transcription.

It's now known that NAD+ plays a central role in BER. For our purposes having adequate NAD+ to activate SIRT6 to signal the BER for demethylation on active DNA is an essential component for radical life extension. BER is a multi-step process that erases epigenetic markers and restores access to protein codes.[43,44]

In simple terms, NAD+ turns on SIRT6 that turns on enzymes that remove a variety of epigenetic modifications on DNA; the thorns 'on top of' the code. And if not removed, these lesions can lead to mutations when cells divide, hinder critical DNA transactions such as preventing cell division, cause protein transcription errors and even trigger apoptosis (cell death).[44]

Unrepaired base damage is obviously implicated in premature aging.

Sirtuins and histones

DNA is wrapped around histones that hide some codes and expose others. Activating and deactivating code on histones is regulated by sirtuins. Protein codes are identified for transcription by the placement of acetyl groups at a location to identify where mRNA can open

code to start the process of making a protein. Sirtuins perform the essential act of deacetylation; removing acetyl groups to deactivate the code until needed again. SIRT6 in the nucleus controls deacetylation on chromatin for life extension.

The primary components of chromatin are histones which bind to DNA and function as 'anchors' around which the strands are spooled. The histone spools, in the cells of the organs, hide or expose protein codes to allow the cells in the eyes or the liver to only make the proteins needed to maintain function in the eyes or liver. But more important than their role in acetylation, is their role in demethylation. SIRT6 signals base excision removal enzymes to cut out cytosine methylated sections in malfunctioning histones and replace them.

These methylation thorns reduce the tight control of suppressed and expressed protein sequences of that cell type and the control of cell-specific protein codes can be lost. As more and more of these methylation 'thorns' build up, less and less code is able to be read correctly and the cell gets confused as to what type of cell it is.

This is exactly like driving with broken windshield wipers on your car. At some point the scratches, bird dung and dirt on the glass builds up so thick you can't see anything. If you don't just stop the car you could crash.

Similarly, when these methylation thorns on the DNA build up past a threshold, where cell transcription processes can't 'see' the code, the cell stops. It stops as a safeguard

because it can't make the proteins that keep the cell the type of cell it is.[45] It simply loses its ability to see the code it needs and stops its normal function. It's not dead but rather in a senescent state. When a cell enters the senescent state, it secretes toxic pro-inflammatory cytokines that damage adjacent cells. Then, to add insult to injury, senescent cells accelerate the accumulation of more senescent cells.[58]

Even a relatively low amount of senescent cells is sufficient to cause tissue dysfunction and plays a causal role in driving aging and age-related diseases. If these thorns are not removed, a war is waged between the number of cells still functioning and those that are suffering from their damaged DNA. Then the count-down is on until the day when the still functioning cells are over-burdened by the raging chemical fires escaping from inside of the senescent cells...and the war is lost.

This condition is similar to a fireplace chimney when it becomes plugged. The plugged chimney spreads smoke and fire into the house and the house burns down. If too many chimneys get plugged and there aren't enough fire fighters to put out all the fires, the entire town burns down.

However if there is a sufficient amount of NAD+ to activate SIRT6 after DNA repair, the repaired DNA can be demethylated. Once these thorns that are bonded to DNA are removed, cells can be returned to optimal protein code synthesis, gene expression and youthful expression.

We can win this losing battle!

I used to think time was the enemy but now I know it's only the lack of battlefield knowledge that loses the war.

Breaking the death barrier is within our grasp.

Chapter 9

Restoring Youth

"Some men see things as they are and ask, 'Why?'
I dream of things that never were and ask,
'Why not?'"

– Robert F. Kennedy

I am one of a growing number of researchers that are convinced that aging is not inevitable. Understanding how to maintain youthful cellular function is one of the puzzles to solve to attain functional immortality.

So let's start applying what we've learned.

Starvation stress stimulates the synthesis of NAD+ to activate sirtuins to remove DNA methylation. Sirtuins activate the BER pathway to restore genetic integrity by removing methylation thus preventing senescence.[40]

This functionally reverses the main cause of aging and because of this, dry fasting is the foundation method to reverse aging.[85]

There is also a unique relationship between the nucleus and the mitochondria.[48] It's been proven that during starvation, NAD+/NADH ratios increase *and* activate SIRT1 that signal mitophagy to repair or replace mitochondria. Furthermore, reaction oxygen species production is suppressed in starved cells reducing mitochondrial damage during mitophagy. Conversely, in the fed state NAD+/NADH ratios fall and inhibits autophagy and subsequently mitophagy.

Cellular dysfunction reversal = age reversal

Starvation stress, exercise, cold showers and hunger can activate nicotinamide mononucleotide and nicotinamide riboside to make NAD+ that is needed to activate sirtuins.[2,3,48,49] NAD+ activated sirtuins stimulate the BER pathway to remove the methylation markers left at the DNA repair sites.[50,51] Once these artifacts of repair are removed, it allows the DNA code to once again tightly re-spool onto the histones. This re-establishes the tight control of the exact protein codes exposed during transcription, to enable an eye cell or a liver cell to restore youthful protein code synthesis.

This is a prerequisite for extending lifespan.

This results in the return of youthful cellular function. This repair capability is built into us, but this level of system-wide restoration is never activated unless you deliberately stop eating for a period of time.

Very simply, if you eat every day of your life, deep system-repair isn't activated and bad outcomes become inevitable.

What is youth?

It's my view that youth is a cellular condition measured by functionality, it's not measured by years. Youthful appearance is a macro expression of the cellular state of youthful cellular functionality.

Dry fasting effectively 'de-ages' cells because cells can employ autophagy to rapidly restore inner cellular organelles. As the body's overall level of functionality is

restored, the cells in the whole body can once again operate like they did when they were younger and that's not the best part.

Autophagy removes old weak cells, non-functioning cells and cells with too much accumulated methylation damage.

We are cells; 37.2 trillion of them

When seen this way, instead of looking at the body as a head, a heart or an arm, the same landscape unfolds before us to be seen in a new way.

If you've read the previous chapters correctly, you can see what Proust said earlier about viewing the landscape with new eyes. Especially when considering what aging really is and what keeps you alive; it's the cells ability to deal with the challenges of daily life and surviving its complex environmental stressors.

The cells make the connective tissues, like collagen and elastin, to make skin supple and to hold all the organs in place.

Cells in the muscles make the actin proteins that hold the muscle cells in bundles.

The cells make their extracellular matrix that holds structured water outside the cells and allow cells to communicate with each other. Like a vast 'cell-a-communication' network of secreted proteins and carbohydrates that fills the extracellular spaces to help

cells bind together and regulate migration, proliferation and differentiation.

Everything is made in cells or processed by cells.

When you finally see the landscape this way, youthful cells set the stage for life extension. There is no other way.

"To get back my youth I would do anything in the world, except take exercise, get up early or be respectable."
- Oscar Wilde: the Picture of Dorian Gray

Chapter 10

Endogenous Stem Cell Therapy

"I intend on living forever; so far, so good."
- Steven Wright

I've covered a lot of ground up until now to explain how the body's cells can be restored and returned to youthful function. But before we get lost in the weeds here, I need to remind you of what I said on Page 2 since I'm about to discuss stem cells. Without a doubt, stem cells are the most important cells in your body for radical life extension.

"The Phoenix Protocol employs dry fasting for two unique outcomes, rapid healing and its ability to activate adult stem cells and that's its unexpected potential; endogenous stem cell therapy."

To realize this unexpected potential, stem cells have to be woken up to start proliferating. The objective of the Phoenix Protocol is to restore the entire body back to youthful function. Everything discussed before these next chapters is a pre-requisite to see the connection between dry fasting and life extension. Extended lifespan requires waking up stem cells. This has always been the barrier to extending lifespan. We have an army several million strong ready to fight for rejuvenation, but the army is waiting for the call that never comes.

If adult stem cells are unable, for lack of chemical instruction, to periodically replicate they suffer the same

damage as any cell that can't be replaced. They can be damaged during their inactive state, leading to stem cell senescence.[53,73] They don't burn out, they die in their sleep.[45] Then if the signal is never activated to awaken adult stem cells to replace damaged tissue, normal body cells are called upon to divide and repair tissue and this subsequently results in telomere loss during their cell division.

This is normal aging; the ticking clock of telomere loss that progressively makes the entire body older. This inevitably assures that all cells go down the road to senescence and as more senescent cells accumulate, organs malfunction and aging accelerates. Sometimes slower, sometimes faster but normally this is how life ends. However...

"I didn't come here to tell you how this is going to end.
I came here to tell you how it's going to begin."
- Neo- The Matrix

Dry fasting turns off the stem cell 'stay asleep' signal that prevents radical life extension...it's a signal kept on by insulin levels in the blood. Glucose stimulates the pancreas to make insulin so if you're eating and metabolizing sugar you can't turn it off. It takes three days of dry fasting to turn off all insulin production in the pancreas because only then is there no glucose in the blood stream.

This simultaneously turns off the production of the stem cell sleep signal: Protein Kinase A.

...And then the army wakes up!

What are stem cells?

These are cells that have been with us from conception and essential during our embryonic development.

The ratio of body cells to stem cells falls rapidly after birth to around 5000/1 in adulthood or about 7,400,000 stem cells distributed in various tissues. About 200,000 of this number of stem cells are in bone marrow making blood and immune cells daily. Different types of stem cells have different regeneration rates, depending on the organ in which they are found, and their numbers are influenced in complex ways. The argument that you have to be careful with them so you don't use them up, like draining a bank account, is ridiculous since they don't burn out.

However, it can safely be said that, after you reach adulthood, the number of stem cells reach a stable population that assures, as a back-up system, you can repair organs and tissues if damaged.

Normally they reside in the 220 different types of tissues and sleep...waiting...for the signal.

Adult stem cells have been identified in many organs and tissues including brain, bone marrow, peripheral blood, blood vessels, skeletal muscle, adipocytes, skin, teeth, heart, gut, liver, ovarian epithelium and testes. They are thought to reside in a specific area of each tissue called a stem cell 'niche' and typically generate the cell types of the tissue in which they reside.[67] Stem cells are designed to replace damaged or malfunctioning cells with brand new cells, so why don't they do it all the time? Adult stem cells are generally inactive after you reach adulthood

except during injury, even injuries as simple as a paper cut. If it were possible to activate them all at once, the entire body could be rejuvenated.

Activating all stem cells at once

Protein Kinase A (PKA) is an enzyme created by a gene that prevents stem cell activation.[74] PKA is only turned off after all glucose has been exhausted and insulin levels are severely reduced. PKA, (Protein Kinase A) is one of a family of enzymes that have multiple functions in cells but its regulation of the metabolism of glycogen, sugar and lipids is our focus. PKA is activated by the conversion of ATP into cyclic AMP (cAMP) from adenylate cyclase. Adenylate cyclase is anchored on the inner side of the plasma membrane inside cells to convert ATP to cAMP. cAMP's function is to activate PKA to transfer the effects of extracellular hormones like glucagon and epinephrine past the plasma membrane. Glucagon from the pancreas and epinephrine from the renal medulla are hormones that seek new energy reserves in the body. These extra cellular hormones initiate an intracellular signaling cascade via cell receptors that triggers the conversion of ATP into cAMP to activate Protein Kinase A to trigger lipolysis in fat cells.

Fasting for longer than 48 hours switches metabolism to a fat and ketone bodies based catabolism after glycogen reserves are depleted, thereby reducing IGF1 and PKA. (Longo and Mattson, 2014). Glycogen metabolism is associated with the production of IGF1 and PKA in its role in insulin response.

Most stem cells are designed NOT to be replicating all the time, as it would logically lead to abnormal cell division, and are activated by stresses like weight lifting or injury. The presence of IGF1 and PKA assure stem cells are inactive for this reason. When metabolism is transitioned to lipolysis in ketosis, during prolonged fasting, this balance swings the other way. Starvation is a type of stress that activates stem cells because it produces very low levels of IGF1 and PKA. During starvation stress, the body is in autophagy repairing normal cells BECAUSE there is no insulin or PKA in the system. When this metabolic pendulum swings away from sugar toward ketones it activates stem cell regeneration. The Phoenix Protocol employs this capability in a timed period of regeneration.

Scientists at the University of Southern California found that fasting turns off the signal that prevents system-wide stem cell propagation; PKA.[74,75] Releasing this stem cell regeneration 'brake' allows bone marrow stem cells to create new white blood cells - monocytes that create macrophages that locate and 'eat' virus, bacteria, fungi, parasites... and senescent cells.

> *"PKA is the key gene that needs to shut down in order for these stem cells to switch into regenerative mode. It gives the OK for stem cells to go ahead and begin proliferating and rebuild the entire system," - MIT* [76]

This same team of researchers at MIT found that after entering ketosis, it only took 24 hours of fasting to reverse the age related loss of stem cell regeneration in intestinal wall crypt stem cells to restore the gut wall.[77]

"This study provided evidence that fasting induces a metabolic switch in the intestinal stem cells from no longer burning carbohydrates to burning fat instead."

After stem cells wake up

After PKA is removed from the blood stream, stem cell proliferation is signaled; stimulating the asymmetric division phase in the stem cell niches. Adult stem cells begin to divide creating a daughter cell and its own replacement stem cell. The replacement stem cell is left in the niche. The daughter cell goes into symmetric division creating two identical cells that divide again to create four transit amplifying cells; a phase in between stem cells and differentiation. These then divide again and transform into eight progenitor cells; cells that have achieved the potential to differentiate into any cell in their organ niche. The progenitor phase takes 5 days after reaching ketosis. Therefore, dry fasting for 7 days or longer gives all the adult stem cells the time needed to wake up and divide enough times to flood the system with progenitor cells. Dry fasting, that lasts long enough to provide for this regeneration cycle, can provide a unique, system-wide regeneration effect.

Bone marrow-derived 'endothelial progenitor cells' (EPC) are released during that flood and repair the vascular wall of the entire blood system.[106] Successive waves of this proliferation of stem cells create tens of millions of progenitor cells that conduct a system-wide repair and restoration, because the army to fight death is finally on the battle field.

Stem cells in adulthood

Adult stem cells are designed to repair catastrophic injury to restore tissue in order to maintain organ functionality. If they are not activated, it invariably leads to accelerated aging. The primary reason human lifespan is so short is because the act of staying alive is confounded by the chemical signals created by eating that keep the most important repair systems asleep.

Stem cell infusion therapy

Today, a temporary whole-body regeneration of tissue can be accomplished by infusions of cultured, lab grown stem cells from donated umbilical cord blood or stem cells aspirated from your own bone marrow. These therapies are expensive costing around $25,000 per infusion, depending on the clinic, and it requires leaving the country to do it. Thereafter, clinics typically prescribe a cycle of re-infusions at 6 month intervals. But these therapies do not remove senescent cells, they just add a lot of stem cells - a shot gun effect.

Endogenous stem cell therapy

By employing repeating cycles of the Phoenix Protocol you can create successive waves of whole-body tissue regeneration by harnessing the power of your own stem cells. After three days of a dry fast, PKA is turned off and your own stem cells are activated to proliferate. At the same time, your immune system is activated to remove senescent cells. This sequence of events prepares for the propagation of millions of your own progenitor cells to replace the removed senescent cells.

This is a coordinated replacement by your own brand new stem cells and it's a lot cheaper - it's free.

More importantly, it's an exact tissue match compared to the risks taken with using donated umbilical cord blood.

And speaking of exact tissue match, it's the abundance of stem cells during embryogenesis that provides the clue needed to reverse aging and return to a much earlier physical version of you in adulthood.

But stem cell abundance is only half of the story, making sure adult stem cells are accurately targeted to home in on the correct location, to prevent defects and growth errors, is the other half. Simply put, making a new you requires a lot of stem cells and they need an accurate conductor. Like during the time you were created.

Stem cells during embryogenesis

The primary role of stem cells in embryogenesis is to replace removed senescence cells. During embryogenesis, developmentally programmed senescence is followed by macrophage infiltration for the clearance of senescent cells and tissue remodeling.[68] New stem cells differentiate into a new cell in the 'hole left behind.' During this rapid growth, the immune system acts not only as the means of removing senescent cells but also as the accurate conductor needed to prevent growth errors and birth defects.

During embryogenesis, disposal and replacement of removed senescent cells is very efficient because of stem cell availability and the tight temporal control maintained

by the mother's immune system.[31] The massive proliferation of stem cells, during embryogenesis, is from their 100% active telomerase preventing any telomere loss.[36]

Immune system cells prevent growth errors

During embryogenesis, temporal control of senescent cell removal and their replacement, by newly propagating stem cells, is directed by immune system cells in the mother's blood that is shared with the fetus. This chemical cross talk, between stem cells and immune cells, will be discussed in the next chapter.

A baby is born without an immune system. It takes up to two years for the immune system to fully develop and that's why a baby needs to be breast fed.[69] A baby ingests the mother's immune system to stimulate its own immune system.

Breast milk is a form of blood and most of the leukocytes in breast milk are macrophages and neutrophils. Lymphocytes including T cells (natural killer cells) and antibody-producing B cells make up 10% of the leukocytes in human breast milk. All these cells survive passage through the infant's gastrointestinal system where they are absorbed and influence the infant's immune response.[70] The macrophages are essential for removing senescent cells during neonatal growth. This is the way an infant employs the mother's immune system to still remove developmentally programmed senescent cells. It's the mother's immune system cells that continue to direct the baby's own stem cells, during neonatal growth, when

the infants own immune system and microbiome are still developing prior to weening.

Conclusion

The immune system cells are the way stem cells are accurately targeted for homing in on the specific locations to replace removed senescent cells while preventing growth errors during tissue remodeling.[71,72] It also indicates how important a new and effective immune system is for accurately remodeling your own body tissue. The mathematical progression of endogenous stem cell proliferation can result in several million stem cells being distributed in all the different types of body tissue.

Seven days of dry fasting activates enough of your own stem cells for a whole body restoration. How long the restoration lasts is dependent on an amino acid sequence we have seen before; TTAGGG.

Chapter 11

Telomerase Activity in Stem Cells

"Those who are crazy enough
to think they can change the world usually do."
— Steve Jobs

The veracity of the argument in this book's premise boils down to one thing; the loss rate of telomeres in stem cells.

The foundation of radical life extension, and indeed the idea of discovering how to achieve functional immortality, is entirely dependent on the ability of endogenous stem cells to provide a dramatically longer cell life after replacing old cells. It would make no sense inserting cells that don't age well during tissue remodeling. Our body already replaces tissue via normal cell division and we know that outcome only too well.

As we discussed in Chapter 6, in most human somatic cells, telomerase activity is diminished after birth so that telomere length shortens with each cell division; the Hayflick Limit; a 40 to 60 division time clock.[36]

"But not stem cells."

An *in vivo* study of adult stem cells in 2008, indicated that adequate telomere length is a pre-requisite for the functionality of stem cells.

Usually the level of telomerase is low in the majority of human stem cells, whereas it is up regulated in ones

that undergo rapid expansion. Like the stem cells in bone marrow that make red blood cells, white blood cells during infection, cells in the dermis making hair and even tissues with a low cell turnover such as the brain. Evidently, function dictates the need for a more or less active telomerase profile in stem cells.

Stem cells are unique; capable of generating a very large number of committed progenitors and their descendants during a small number of self-renewal divisions. As inferred above, one important function of telomerase, in hematopoietic stem cells (HSC), is to reduce the rate of telomere loss during the period of rapid cell division; preventing premature critical shortening of telomeres and loss of telomere function.

Some studies indicate that in the presence of growth factors, some hematopoietic stem cells are capable of more than 100 population doublings.

This is a pertinent finding since dry fasting stimulates the release of human growth hormone; a growth factor released during the same time as stem cell activation and proliferation coincidentally during the protocol.

Telomerase activity in pluripotent stem cells

HSC's may have better than normal cell telomerase activity but it's quite a bit different in pluripotent stem cells. Pluripotent stem cells (PSCs) have the potential to produce any types of cells, from all three basic germ layers, and the capacity to self-renew and proliferate indefinitely *in vitro.*[104]

The larger question is if they can they self-renew and proliferate indefinitely *in vivo.*

The evidence is strong that they do.

In 2014, it was shown that pluripotent stem cells exhibit high telomerase activity to maintain their extremely long and stable telomeres.[104] Such characteristics are likely key to their abilities to differentiate into diverse cell types *in vivo*. Additionally, many niches have been identified to hold a small percentage of a unique type of pluripotent stem cells like fat, dermis, bone and gut called 'Muse' stem cells.

Suffice it to say, pluripotent stem cells can provide the necessary continual regeneration of telomeres by active telomerase; approaching the immortality of embryonic stem cells. From the last chapter:

> *The massive proliferation of stem cells during embryogenesis is from their 100% active telomerase preventing any telomere loss.*[36]

And there is a readily available source of pluripotent stem cells, perfectly suited for radical life extension, released at the beginning of a dry fast.

The A(T) team

The best source of stem cells to initiate tissue remodeling are the ones released first; Muse-AT stem cells from your

own adipose tissue (AT). They are released into the blood stream on day 3 of a dry fast when PKA levels drop.

Muse-AT stem cells are pluripotent.

They intrinsically retain lineage plasticity and the ability to self-renew and proliferate indefinitely; spontaneously generating cells representative of all three germ layers from a single cell.

At the beginning of a dry fast, the immune system is in rapid expansion mode creating millions of macrophages to remove senescent cells. These vacancies can then be replaced by Muse AT stem cells. These special Muse stem cells, that have indefinite proliferation capacity and active telomerase, can replace any type of cell.

Do I even need to mention that every cell that is replaced by a Muse stem cell is thereafter... immortal?

Chapter 12

Muse AT Stem Cells

"Great things are done
by a series of small things brought together."
- Vincent Van Gogh

Muse stem cells were first discovered in 2010 by Mari Dezawa at Tohoku University in Sendai, Japan.[78,79] 'Muse' stands for: Multilineage differentiating stress enduring cells.

A seminal paper was published in the journal, *QJM: An International Journal of Medicine* in December, 2018 that recognized the importance of this discovery titled:[79]

'The Revolutionary Muse Cell, A Puzzle Solved'

This is an incredible understatement. Muse cells represent 4% of the total stem cells found in fat cells. These muse cells are called Muse-AT (adipose tissue) stem cells.[80] Muse cells are pluripotent and are found in every organ niche.[71,79,80,81,82,83] Pluripotent stem cells are unique because they can immediately differentiate into any type of cell, even nerve cells.[85,86]

Dry fasting releases Muse-AT stem cells directly into the blood stream where they are distributed throughout the body. They are tough and they replicate fast.[87] In fact, they propagate at a rate second only to Wharton's jelly from umbilical cord stem cells.[84,88]

Muse AT stem cells are released from fat cells three days into a dry fast and go into rapid expansion. This unique type of stem cell actively starts differentiating into other cell types after it enters the blood stream; starting with repairing the vascular system wall and heart muscle.[71]

Muse cells are from one to several percent of mesenchymal stem cells of the bone marrow (the source of the immune system cells) adipose tissue and dermis.[89]

Muse cells repair tissue by transforming into any lost cell types. After homing in to a tissue site, they can spontaneously differentiate into dermal and epidermal cells.[90] They can spontaneously differentiate into neuronal cells and intravenously injected Muse cells differentiate into liver components after homing in on lost cell sites.[86,91,92]

Paracrine signaling

Paracrine signaling is a form of cell signaling, or cell-to-cell communication, in which a cell produces a chemical signal to induce changes in nearby cells; altering the behavior of those cells. More recently it has been shown that many of the functional improvements, attributed to stem cells, may be due to paracrine actions, in the host tissue, rather than cell differentiation and re-population e.g., chemically induced transformation.[93] A resultant shift in research has seen the emergence of studies aiming to elucidate the paracrine mechanisms, underlying tissue repair and regeneration, with stem or progenitor cell transplantation.[93] The chemicals secreted from stem cells

initiate a chemical cross talk that changes local cells to be restored. In fact, it's the stem and progenitor cell paracrine secretions implicated in immunoregulation, cell proliferation and migration, neovascularization and extracellular matrix synthesis and remodeling that accelerates wound healing.[94,95]

As I said, Muse stem cells are pluripotent and can differentiate directly into any type of cell. Their most important task, at the beginning of a fast, is to replace an aging immune system with new set of immune cells; induced by using this cell-to-cell paracrine signaling between immune cells and Muse cells. This is a critical time-dependent transformation incorporated into the Phoenix Protocol. Why is this critical?

Chemical cross talk between immune cells and stem cells

It has been discovered that immune system cells communicate with stem cells using a type of chemical cross talk.[96,97,98]

This chemical cross talk instructs Muse cells and newly propagated progenitor cells to 'home-in-on' damaged organ or body tissue to target the location that needs repair and remodeling.[71] And like I said earlier, stem cells require accurate direction.

An aged immune system can't accurately direct stem cell targeting, but at the beginning of a dry fast bone marrow stem cells are in rapid expansion replacing the aged immune system.[84] This early replacement of the immune system assures that five days later, when the stem cell propagation in the organs are at their progenitor

phase, differentiation and repair can be accurately targeted utilizing this communication between the new immune system cells and new stem cells.

And finally, with millions of new stem cells providing their paracrine signaling, all your newly demethylated cells with their fully functioning protein codes can be kept younger between your protocol cycles.

This enables the longer lifespan and younger body I proposed on the first page of this book.

This is my method for attaining functional immortality.

I wasn't kidding when I said... 'all the parts exist to heal illness, extend life and maybe... even live forever.'

The information in this book proves that by periodically abstaining from food and drink, for only a week at a time, the body can rejuvenate cellular function to restore youth.

Can it be any simpler than that?

Not to put too fine a point on it but...by the time you're 50 years old you've lived for 2600 weeks, that's two thousand six hundred weeks.

Are you willing to give up one or two weeks per year dry fasting for the possibility of getting thousands more?

Chapter 13

The Phoenix Protocol

"Half of getting what you want is knowing what you have to give up to get it."

- Wayne Dyer

The Phoenix Protocol is a 7-day dry fast performed once or twice per year; with a minimum of a six month interval between fasts. Rest periods between protocols allows time for new stem cells to chemically induce restoration in their resident tissue.

I remind you that the Phoenix Protocol is designed to give you a longer life in a younger body; upwards of 25 years.

"...the regular practice of dry fasting can extend life and youth by 15 - 25 years."

-Dr. Filonov

Ease into it

Your initial dry fast should begin, as Dr. Shchennikov recommends, with a one day dry fast. Then gradually increase the number of days, as your confidence in the method builds, until you can complete 7 days. This may take some time but most people that start dry fasting find that it's surprisingly easy and advance to the 7-day fast rather rapidly. Dry fasting is a serious undertaking that transitions the body into a state of starvation. It takes commitment to both perform it and to have the mental will power to complete it.

Use common sense

Since most people have never experienced fasting, normal reactions can be misinterpreted as symptoms of a problem. Anxiety, fatigue, brain fog, fluctuation in heart rate, fever and insomnia are common during dry fasting as various metabolic processes are being adjusted and repaired. As Dr. Shchennikov states, these symptoms are a normal part of dry fasting and not an indication of a problem. **But if you feel uncomfortable during your fast, you should err on the side of caution and end the fast.** You can always attempt another fast later. You need to be in the right mindset to fast in the first place, e.g., you "want to do it" not "you have to do it".

Note: **If you have health issues, any fast longer than 3 days should be done under medical supervision.**

If heart rate approaches 120 beats per minute during the fast, end the fast.

Dry fasting is not indicated for the following conditions:

Cirrhosis of the liver, Cholelithiasis (gall stones) and urolithiasis (bladder stones), thrombophlebitis (vein clotting), expressed varicose veins (enlarged and twisted, often appearing as a bulging, blue blood vessels that are clearly visible through the skin) and blood clotting disorders.

Dry fasting as described by Dr. Shchennikov

"You will not get the full benefits if you do not complete at least 5 days of fasting in ketosis but if you continue to the 7th day the repair phase will be greatly enhanced - if you choose to remain in the fast deeper problems will be fixed after a second acidotic crisis at day 8 to day 11. If a chronic illness is not eliminated during the course of a first dry fast it's possible to repeat the course again in a month (or later) after the full exit from the previous course. This then can reactivate the healing processes to tear the disease from the root and also effectively contributes to prevention."

Dry fasting as described by Dr. Filonov:

"Medical dry fasting is effective if it is applied correctly to pass certain stages over 5, 7 and 11 days. These stages are punctuated by two periods of mildly uncomfortable acidotic crisis periods that provide a condition of acid pH to stimulate the hydrolytic actions of autophagy. Autophagy is employed to deconstruct biological materials that are pathological, age damaged, environmentally damaged or genetically altered. The crisis periods last for predictable time periods based on cellular metabolic and autophagic chemical reaction times based on the relative health of the patient."

The Phoenix Protocol is more than just dry fasting

The Phoenix Protocol employs a 7-day dry fast to restore cellular metabolism, stimulate an endogenous generation of stem cells and includes specific longevity nutraceuticals to maintain tissue regeneration following the fast. Firstly, Fisetin is administered for 7 days prior to the fast to start eliminating senescent cells. Following the fast, three specific neutraceuticals are administered, one to maintain bone marrow production of immune cells, a polyphenol complex to protect new stem cell mitochondria from oxidative damage and a resveratrol complex to increase NAD+ synthesis to activate SIRT1 for continued demethylation of DNA in cells. This regime extends the period of tissue regeneration via stem cell paracrine signaling from newly generated endogenous stem cells.[93]

During the fast

The Phoenix Protocol

Like I said at the beginning in Chapter 2, it's time to rest and relax for the next 7 days and not eat or drink anything. It's really that simple. Use the helpful tips at the end of this chapter to make it easier to complete the protocol.

This is a great time to read books, listen to music, binge on episodic television shows or just rest. It's not difficult, maybe a little boring toward the end but you won't be hungry or thirsty on the program.

Water procedures

Carrying out water procedures is a must. It's advisable to take a cool or cold shower morning and night to moisturize the skin. The counter flow of water through the skin is essential for helping the lymphatic system to flush toxins. Use showers, bathing, swimming, high pressure shower massage, etc. Make sure NO water enters your mouth.

Physical activity

The best physical exercise is walking in fresh air. It's suggested to walk 30 minutes or more per day. Generally, just being outside in the open is best because the more fresh air you breathe, the better. In addition, you can perform rebounding to help the lymphatic system. Avoid over exercising and fatigue.

Enemas (recommended by Dr. Shchennikov)
An enema is recommended before and during fasting if you're prone to constipation otherwise they're not necessary.

If there is any hunger at all during a fast, an enema will stop it.

What to expect
To find out what you can expect on a day to day basis, during your fast, refer to Dr. Shchennikovs 11 day dry fast description on page 53. And if you're not trying to heal a major illness, just stop at the end of day 7. The Phoenix Protocol employs dry fasting for its stem cell regenerative effects, it's not designed for treating disease.

Helpful tips to make dry fasting easier
Dry fasting can change body temperature, like creating fever, as illness is being addressed. There are also changes in sleep and rest periods. Here are some helpful tips to make it a little easier so you can stay with it until the end. These suggestions come from family and friends that have completed long dry fasts.

Morning, noon and night: Go outside and do deep breathing, as much as you can. Breathe deeply and if helpful, breathe through one nostril at a time to get deeper breaths.

Fever: Go outside at night when it's cold or take cold showers or baths. Cold moist compresses or lay in front of a large room fan.

Cold or Chills: Sleep or lay with a hot water bottle.

Sleep: Lay in front of a large room fan on high. Lay or sleep outside at night on a chaise lounge in the dark and listen to nature.

Coffee craving: Wake up and smell the coffee...just don't drink it.

Food craving: Sniff citrus essential oils during the day, like tangerine, orange or lemon. And sniff peppermint and eucalyptus at night or any soothing essential oil. Use an essential oil diffuser to add fragrance to room air.

Boredom: Reading or binge watching TV shows, watching movies, slow walks in nature.

Grounding (Earthing): Go outside barefoot and stand on wet grass or the earth to get grounded.

Anxiety: Meditate or listen to soft music or meditation relaxation music or cuddle with a pet.

Hyper mental activity: Go on the internet and learn new things, watch YouTube videos, read articles of interest.

PROPERLY EXITING A FAST

The process of coming out of starvation is more important than going into it. *- Dr. Shchennikov*

This means that after a fast you have to gently restart your digestive system. Don't overeat and above all avoid sugar and carbohydrates. The stomach has to be restarted slowly with water and broths like bone broth. The pancreas has to be restarted gently with soups that don't stress the insulin producing cells and restores the production of PKA - essential for insulin production.

Re-feeding syndrome

The Phoenix Protocol employs post-fast liquids and supplements to transition out of starvation by immediately replenishing depleted electrolytes; sodium, magnesium, phosphorus and potassium. This will prevent re-feeding syndrome.

Re-feeding syndrome is when too much food or liquid nutrition of specific types (e.g., protein drinks, banana smoothies, etc) is consumed during the initial 2 to 3 days after a fast.

When the wrong foods or too much food is introduced post-fast, before replenishing electrolytes, it can cause an abrupt shift from fat metabolism back to carbohydrate metabolism. This can cause insulin secretions to spike, triggering the production of glucose, fat and protein metabolism (gluconeogenesis) in cells which can lead to edema and other issues. This is why electrolyte

replenishment is so important: to prevent adverse reactions before the re-introduction of food.

Your digestive system is sensitive after a fast

When you spend 7-days fasting, your stomach and intestines shrink in size and new tissue has been regenerated, making them sensitive. The period recovering from fasting should take as long as the fast itself because the digestive organs must be 'restarted' gently. Many of the benefits of the fast will be canceled if it's ended incorrectly. Conversely, the benefits will be strengthened if ended correctly.

The second critical post-fast rule is to not consume sugar in any form; sugar laden carbonated drinks, sugar substitutes like splenda, zero calorie drinks, fruit juices, grape juice and carbohydrates in general, because these foods cause immediate spikes in insulin resulting in rapid weight gain. Fresh fruit can be consumed in small amounts on the fourth day after exiting the fast.

After a fast the pancreas is very sensitive and eating sugar will negate many of the benefits from dry fasting by over stimulating insulin production. As an example, insulin will stimulate fat cells to hold more fat, prevent mitochondria from burning fat and stimulate angiogenesis; (the creation of new blood vessels) and subsequent lipogenesis (the creation of new fat cells).

More importantly there is evidence in vitro, that stimulating stem cells with insulin will turn stem cells into fat cells. It has yet to be shown in vivo but why gamble with your newly generated stem cells.

After the Fast

The first thing to do after ending a fast:

Mix ½ tsp baking soda into 8oz of water and sip this SLOWLY over 15 minutes to replenish sodium.

Re-establishing electrolytes
Take a magnesium and potassium supplement after the fast (and every day of the recovery period to replenish these electrolytes).

Beyond Tangy Tangerine 2.0 (by Youngevity)
A complex of 90 different nutrients including essential minerals and electrolytes. Mix 2 scoops in 10-12 ounces of cold water or mineral water and drink over the course of the first day. (Drink this daily for the next 14 days.)

Avoid all acid drinks - no citrus or vinegar

Re-feeding
DO NOT OVEREAT
DO NOT OVEREAT
DO NOT OVEREAT (Do you get the picture?)

Day 1 - 3
Take a probiotic daily to re-establish the gut microbiome. Drink 6 to 8 glasses of liquid daily to re-hydrate. This can be water, carbonated mineral water, coconut water (1 cup per day). You can also consume vegetable, beef or chicken bone broth. Keep tea and coffee to a minimum if you're prone to insomnia.

Fat cells have been drastically reduced in size and the small blood vessels that service them have been reduced in number as well. Don't immediately grow them back by eating sugar or overeating. Many of the benefits of the fast, like weight loss, will be canceled if it's ended incorrectly.

So in the following days putting weight back on, or keeping it off, will solely depend on the amount of food consumed.

Day 4 - 7
After the third day, slowly introduce normal foods but be conscious to avoid foods with sugar and carbohydrates (bread, pastries, cereals, bagels, etc) and remember to continue to eat small amounts (typically the size of your fist) to prevent rapid weight gain. Fruit is not recommended for the first 3 days since it contains fructose; a form of sugar. Eat small amounts of easy to digest food at any given time. Steamed vegetables, soups, salads, (no tomatoes or spices), fermented foods (sauerkraut, kimchi, natto), yogurt and kefir, etc.

Stay hydrated and make sure you're drinking enough water. Water is necessary for proper digestion.

Food quality
Avoid all wheat and grains, processed foods, sugar and sugary drinks. Eat a whole food diet. Significant activation of metabolism and protective forces return as the body begins to actively absorb nutrients coming from food. It's very important at this time to eat only high-quality foods.

Avoid strenuous work

During this time it is necessary to observe a stricter regimen than with fasting itself; more rest. Don't take long walks, don't perform heavy physical work and don't overwork. As your nervous system and energy production is resetting, in the first 3-5 days out of starvation, there is an associated serge of mental energy while your body strength is re-established. Weakness, dizziness, even fainting can occur so don't overtax yourself.

Post fast enema

It is recommended to perform an enema, on the second and third day after exiting starvation, to get rid of waste deposited in the bowel during the detoxification phase of fasting.

Post-fast nutraceutical supplementation

To achieve the goals of the Phoenix Protocol, specific nutraceuticals are recommended to supplement the food list in the next chapter.

There are three daily supplements formulated for the Phoenix Protocol; ***Stem Cell Re-Gen, Polyphenol Plus*** and ***Resveratrol 1000*** (*see page 131*).these have been formulated to support new stem cell paracrine signaling, enhance NAD+ synthesis to activate the sirtuins, to support demethylation and prevent oxidative stress in neural stem cell mitochondria.

Day 14

The stabilization phase begins at the end of the recovery period. This phase is characterized by a normalization of metabolic processes in the body and nervous system. You'll experience an elevated mood with more energy, deeper sleep, a normalization of appetite and stabilization of weight.

Note: *Since you have created brand new baby skin cells, you have to treat them as such and protect them from the sun. Wear a hat and protective clothing for at least a month until your skin cells are strong again. Don't lay out and get sunburned.*

"Many of life's failures are people who did not realize how close they were to success when they gave up."
– Thomas A. Edison

Chapter 14

Feeding New Stem Cells

"Eat like your life depends on it because it does."
- Suzanne Somers

Nutritional supplements as well as certain foods have been proven to promote the growth of human stem cells.

The combination of blueberry, green tea, L-Carnosine and Vitamin D3 has been shown to have a potent synergistic effect that increases proliferation of human hematopoietic progenitors by 70%.[99,100] Spirulina has been shown to protect neural stem cells and newly proliferated stem cell mitochondria in the brain.

To incorporate this research into the Phoenix Protocol ***Stem Cell Re-Gen*** was created. It's recommended as a daily post-fast supplement. Whether you decide to fast or not it's a good idea to take this supplement to strengthen your immune system.

Polyphenol Plus is another post-fast supplement combining polyphenols and anti-oxidants that are needed to protect new stem cells and their mitochondria from oxidative damage. It supports demethylation and has powerful anti-aging and anti-inflammatory properties.

ECGC found in green tea, curcumin found in turmeric, sulforaphane found in broccoli sprouts, goji berries and other fruits and vegetables feed neural stem cells and are powerful cellular nutrients.[100]

The foods listed below are scientifically recognized to support stem cell regeneration, proliferation and prevent oxidative damage in their mitochondria.[101] For the sake of your new stem cells, it's advisable to adopt as many of these as you can into your daily diet. These foods are beneficial to all your cells anyway, not just stem cells.[100]

Eat from this list every day for 2 months

- 60 grams of protein: grass fed beef, pasture raised chicken and eggs, wild caught salmon
- ½ cup blueberries or blackberries
- 2 cups green tea or supplementation
- 500mg L-Carnosine
- 3 grams spirulina
- 2000 IU Vitamin D3
- 500mg astragalus powder
- ¼ cup goji berries
- 1 clove garlic
- ½ cup broccoli sprouts

Broccoli sprouts are a super food

The sulfurophane in broccoli sprouts is 100X more concentrated than in broccoli. Sulfurophane activates at least 200 genetic processes via the NRF2 pathway in cells and stimulates proliferation and differentiation of neural stem cells. Start sprouting!

"Immortality is not a gift,
Immortality is an achievement
and only those who strive mightily shall possess it."
-Edgar Lee Masters

No Expiration Date

"And the LORD God said, Behold,
*man has become as one of **us**...and live forever."*
- Genesis 3:22

Uh,.....Us?

A Longer Road Ahead

It's almost impossible to convey how you will feel after you complete your first Phoenix Protocol dry fast but it will be abundantly clear that the power to heal is in your hands. Ironically it's a power you've always had. This will lead to a paradigm shift in your thinking about health and longevity.

This book's outrageous idea is not just about dry fasting for health and longevity, it's about giving you a new perspective; one that allows you to actually consider how long it's possible to stay alive.

The objective of the Phoenix Protocol is to restore youth by restoring youthful cellular functionality to arrest death by staying too young to die.

In every respect the Phoenix Protocol is the gateway to functional immortality. And while it can indeed create a younger and healthier physical version of you, how you treat that younger version is entirely up to you. Eating clean food,

drinking clean water, getting deep sleep, regular exercise and thinking positive thoughts is a good start. Life style and life extension go hand in hand to assure that you pass through that gateway into a healthier and longer future.

Nothing is certain and user results may vary but this idea might provide an opportunity that few have ever realized; a longer, perfectly healthy lifespan unending into the future.

Historically, these kinds of discoveries change the landscape. Knowledge can be destructive to existing paradigms and taking knowledge and using it can result in being cast out of Eden or Olympus...or society. In Plato's *Republic*, the story '*The Cave*' is the perfect example of trying to free the hypnotized of their strongly held perception of the world and how strongly humans hold on to their illusions. The moral of *The Cave* is: unlike a horse, you can't even lead humans to water.

But I firmly believe this from 1710AD:

"Knowledge is given to us to do good with so that others may light their candle at our lamp."
- Mathew Henry

With gratitude,

August - the next immortal...

On a freezing day in late November 1973, I was walking with my father, Dr. Thomas Wesley Dunning; a surgeon and obstetrician by trade, on his polled Hereford cattle ranch in Connersville, Indiana. We were in a pasture checking on cows getting ready to calve and I remember him turning to me and saying...

"You know son, I really love delivering babies. I have strong feelings about life. I've seen a lot it begin, but as far as I'm concerned life doesn't begin at conception. Eggs and sperm don't suddenly come alive; they're already alive. Life has always been there, it's survived since it began in Earths primordial sea. Life is an unbroken ribbon of hope stretching back billions of years."

I asked him what life's hope was...and he said;

"Simple...life's hope is to not die"

To contact August: PhoenixProtocol@yahoo.com

RECOMMENDATIONS:
The following supplements are recommended as part of the Phoenix Protocol. However, if you are not going to perform the protocol, it's certainly advisable to take these supplements to remove senescent cells, to activate your longevity enzymes; the sirtuins that perform demethylation, strengthen your immune system and protect your stem cells and mitochondria.

The combination of both Resveratrol 1000 and Polyphenol Plus provides the polyphenolic compounds required for extending lifespan, by increasing the activation of longevity promoting sirtuins and the biogenesis and protection of new energy producing mitochondria.

Note: *Resveratrol is oil soluble and must be consumed with a fat such as MCT oil, coconut oil, butter, whole milk, full fat yogurt etc. According to Dr. David Sinclair, resveratrol is not absorbed when taken with water (coffee, tea, soda, etc.) since water deactivates it in as little as 15 minutes.*[123]

Supplementation for the Phoenix Protocol:
The combination of:
Fisetin 500 to remove senescent cells.
Resveratrol 1000 to stimulate NAD+ synthesis to activate sirtuins.
Polyphenol Plus to restore mitochondrial ATP production.
Stem Cell Re-Gen to regenerate a new immune system.

Pre-fast nutraceuticals

Fisetin 500mg available at www.Cytolyfe.com
98% pure Fisetin to remove senescent cells and neutralize their pro-inflammatory cytokines. Take one Fisetin 500mg capsule per day for a week prior to the Phoenix Protocol 7-day dry fast. Take between protocols.

Post-fast nutraceuticals

Stem Cell Re-Gen available at www.Cytolyfe.com
Nutraceuticals to support bone marrow stem cells to produce immune system cells and protect mitochondria in neural stem cells. Take daily between protocols.

Polyphenol Plus available at www.Cytolyfe.com
An anti-aging formulation that neutralizes the effects of free radicals to prevent oxidative damage. Take daily between protocols.

Resveratrol 1000 available at www.Cytolyfe.com
Contains the active form; trans-Resveratrol and quercetin to support demethylation by supporting the synthesis of NAD+ to activate sirtuins. Take daily between protocols.

Beyond Tangy Tangerine 2.0 available on Amazon.
A multi-vitamin and mineral complex.

Additional equipment

Carbon shower filter
To safely shower during a dry fast (and anytime) these are available at most hardware stores. The filter screws on to the pipe and you re-attach the shower nozzle to the filter.

Enema bag (if necessary)
Purchase at local pharmacy.

Sprouting jar & broccoli seeds
Purchase at a local health food store.

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Glossary

Abasic sugar: simple sugars scientifically called monosaccharides. In DNA the backbone is made of alternating phosphates and single (simple) sugar molecules that act as a framework to hold the nucleobases.
Adrenal medulla: the inner portion of adrenal gland that sits on top of the kidney. The adrenal medulla makes epinephrine.
Antidiuretic hormone (ADH): is also known as vasopressin. It activates the adrenal medulla to release epinephrine.
ATP: Adenosine Tri-Phosphate is a high-energy molecule found in every cell. Its job is to store and supply the cell with needed energy.
Carboxylic acid: is an organic compound at the end of a fatty acid attached to a chain of hydrogen and carbon atoms.
Cytokines: are a broad and loose category of small proteins that are important in cell signaling.
Demethylation: is the chemical process resulting in the removal of a methyl group (CH_3) from a molecule.
Electrophilic: are positively charged or neutral species that accept an electron pair in order to bond to a nucleophile.
Embryogenesis: is the process by which an embryo forms and develops.
Epigenetic: is the study of heritable phenotype changes that do not involve alterations in the DNA sequence. The Greek prefix epi- implies features that are 'on top of' or 'in addition to.'
Endogenous: having an internal cause or origin.
Exogenous: caused by an agent or organism from outside the body.
Fatty acid: a carboxylic acid consisting of a hydrocarbon chain and a terminal carboxyl group especially occurring as esters in fats and oils.
Glucagon: a hormone formed in the pancreas which promotes the breakdown of glycogen to glucose in the liver.
Gluconeogenesis: formation of glucose within the body from precursors other than carbohydrates.
Glucose: a simple sugar which is an important energy source in living organisms and is a component of many carbohydrates.

Glycerol: a metabolic intermediate and a structural component of the major classes of biological lipids like triglycerides.
Glycogen: the main storage form of glucose in humans.
Glycogenolysis: is the breakdown of glycogen to glucose-1-phosphate and glycogen.
Glycolysis: the breakdown of glycogen into simple sugars for metabolism in the liver to make energy.
Glycosylase: DNA glycosylases catalyze the first step of the process by which damaged bases in DNA are removed and replaced.
Hippocampus: a region of the brain that is associated with memory.
Histone: spools around which DNA winds and playing a role in gene regulation.
Hormetic: an adaptive response of cells and organisms to a moderate (usually intermittent) stress.
Hydrolysis: a chemical reaction in which water is used to break down the bonds of a particular substance.
Hypothalamus: produces hormones including the releasing factors that control the hormonal secretions of the pituitary gland.
Ketogenesis: the biochemical process to produce ketone bodies through the breakdown of fatty acids and ketogenic amino acids.
Ketone: substances produced by the liver during gluconeogenesis, a process which creates glucose in times of fasting and starvation.
Ketosis: is a metabolic state characterized by elevated levels of ketone bodies in the blood or urine.
Lymph: a colorless fluid containing white blood cells which bathes the tissues and drains through the lymphatic system into the bloodstream.
Lymphatic System: a collection of organs, nodes, tissues, ducts and vessels that help to make or transport lymph.
Macrophage: a type of white blood cell that ingests foreign material.
Methylation: process by which methyl groups are added to certain nucleotides in genomic DNA.
Mitochondria: internal cellular organelles that act like a digestive system which takes in nutrients, breaks them down, and creates energy rich molecules for the cell.

NAD+/NADH: Nicotinamide Adenine Dinucleotide is a molecule formed from Vitamin B3 and ATP that acts as a carrier molecule for electrons and hydrogen. NAD+ becomes NADH when two electrons and a hydrogen atom are added to the molecule.
Osmoreceptor: a sensory receptor primarily found in the hypothalamus that detects changes in blood pressure.
Paracrine: a form of cell signaling or cell-to-cell communication in which a cell produces a chemical signal to induce changes in nearby cells altering the behavior of those cells.
Phosphodiester: a covalent bond in RNA or DNA that holds a chain of phosphates and sugars together.
Phytochemical: are chemicals produced by plants.
Pituitary: the master gland of the endocrine system.
Plasma glucose: glucose that is held in the blood.
Pluripotent: capable of developing into any type of cell.
Senescence: the gradual deterioration of cellular function.
Stem cell: a type of repair cell that can differentiate into a tissue cell.
Temporal control: control in a region of tissue preventing growth errors during tissue remodeling.
Transcript mRNA: reading the exposed DNA code on histones.
Triglyceride: a triglyceride is a combination of one glycerol molecule and three fatty acid molecules.
Vascular System: also called the circulatory system is made up of the vessels that carry blood and lymph through the body.

August Dunning is a former NASA Space Station ops system engineer, chemist and physicist. He's currently involved in Mars Mission Planning to address the health challenges astronauts face, by exposure to solar and galactic cosmic radiation, during interplanetary travel. August considers dry fasting to be an effective way to remediate radiation damage, since it has the remarkable ability to restore mitochondrial function and regenerate neurological tissue.

Before adopting this idea for astronaut health, he experimented with dry fasting on himself and successfully healed multiple age-related medical conditions. He also used it successfully with family members and friends and helped them heal a myriad of issues including obesity, Hashimotos, leaky gut, Anosmia (loss of smell) and psoriasis to name a few. In addition, dry fasting healed chronic bladder infections and a chronic (almost decade-long) dental bone infection; neither of which could be resolved with multiple courses of antibiotics.

"Dry fasting may prove to be a way of protecting astronauts from radiation traveling to Mars but, more importantly, it's a means of rapid healing and a surprisingly reliable way of extending lifespan right here on Earth."
- A. Dunning

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